NETWORK WORLD
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AT&T offers array of new 800 features

By Bob Wallace
Senior Editor

DALLAS — AT&T used the International Communications Association ComNet '93 conference here last week to announce toll-free service features that will enable users to handle more 800 calls without adding staff or equipment.

The six new features, made possible by changes in AT&T's network, are collectively called the AT&T 800 Services Global Transaction Network. The carrier said the net upgrade will also enable it to deliver calls 15% faster.

The announcement was timed to follow the arrival of 800 portability, in which millions of dollars of business stands to change hands as customers exercise their newfound freedom to retain their 800 numbers while shopping for price and features.

Shaun Gilmore, marketing vice president for 800 services at AT&T, said adding the new features required the company to consolidate databases and machines used for 800 call delivery.

It used to be necessary to have

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User Dennis Waliczek, BPSI's Brian Derr and IBM's Glenn Van Benschoten (l. to r.) talk up wireless links to the AS/400. See story, page 4.

NetWare users air worries over SFT III for 3.X nets

By Caryn Gillooly
Senior Editor

PROVO, Utah — Novell, Inc. is expected to release into beta test within the next few weeks the NetWare 4.0 version of SFT III — the company's solution for bringing fault tolerance to its LAN customers.

But, if the NetWare 3.11 version of System Fault Tolerance Level III is any indication, Novell has a long way to go before it can reliably support mission-critical applications on a NetWare local-area network.

Users agree SFT III is essentially a good product that is important to users moving high-end applications to LANs. But they also agree there is lots of room for error in configuring the product, and it can cause severe performance problems once it is up and running.

SFT III is a set of NetWare Loadable Modules that allows NetWare customers to set up mirrored servers, where a secondary machine mirrors all hardware and software operations of a pri-

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Start-up sees big role for X.500 directories

Angeli Systems pitches software tools as key underpinning for new distributed applications.

By Bob Brown
Senior Editor

SANTA MONICA, Calif. — Start-up Angeli Systems Corp. is readying an array of X.500 products designed to help users build enterprise directories supporting not only electronic mail, but a variety of other distributed network applications.

Angeli is attacking directory problems in a broad sense, going beyond local, proprietary E-mail directories to position its Traxis products as a vital underpinning of corporate networks. Not only will Traxis serve as a single logical directory for multiple E-mail systems, it will boast interfaces to SQL databases and serve as a general object repository for net management systems, middleware and new distributed business applications.

"Most people think of directory services as being only for messaging," said Chuck Chriss, executive vice president at Angeli. "But when we asked [users] what directories meant to them, we got an astonishing variety of responses."

Steve York, manager of enterprise infrastructure support at

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E-mail community joins forces to simplify X.400 addressing, page 2.

INSIDE

Downsizing efforts hinge on applications plans. Page 40.

Net pitfalls make or break client/server projects. Page 41.

MCI delays rollout of SMDS service

By Bob Wallace
Senior Editor

DALLAS — MCI Communications Corp. last week announced it will delay general availability of Switched Multimegabit Data Service (SMDS) by six to nine months — a move that disappointed users hoping to connect SMDS islands.

An MCI official blamed the carrier's two SMDS equipment providers — Siemens Stromberg-Carlson and Wellfleet Communications, Inc. — for the delay of the first interexchange service, which MCI had promised to make generally available next month.

"We don't have the software from Siemens and Wellfleet that we need to make SMDS generally available," said Paul Weichselbaum, vice president of data marketing for MCI. "We don't want to move to wide availability until we're comfortable that we can of-

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NOVELL EXPECTED to beef up router, add bridging capabilities. Page 2.

FORE SYSTEMS hopes to keep lead in ATM LAN arena with series of announcements. Page 2.

IBM RAMPS UP LAN support with improved version of OS/2, new Unix servers. Page 4.

OBJECT VENDORS, systems integrators join to foster interoperability among their object-oriented technologies. Page 4.

MICROSOFT PREVIEWS support strategies designed to ensure NT's success in enterprise nets. Page 4.

MADGE NETWORKS unveils new adapter card software for improved reliability in NetWare environments. Page 6.

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IBM pushes envelope with distributed object system

By Wayne Eckerson
Senior Editor

AUSTIN, Texas — IBM next month is expected to unwrap the nucleus of a distributed object computing technology that promises to catapult the company ahead of competitors, according to analysts.

Sources said IBM will use Object World '93 to announce System Object Model (SOM) 2.0, a souped-up, distributed version of an object-oriented development environment that IBM shipped last year as part of OS/2 Version 2.0.

The enhanced SOM adds an object request broker (ORB), called Distributed System Object Model (DSOM), which enables users to develop and deploy distributed, object-oriented applications across multiple platforms and network protocols.

Initially, DSOM will manage communications between objects in a work group environment. A later release will incorporate directory, security and other services from the Open Software Foundation, Inc.'s Distributed Computing Environment, enabling DSOM to support enterprise applications.

SOM 2.0, which has been in beta test since January and is due to ship shortly after the mid-June announcement, will initially run on IBM's OS/2 and AIX platforms but will eventually support Micro-

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Novell preps new version of multiprotocol router

Company to merge router, WAN offerings and add support for IBM's source routing scheme.

By Caryn Gillooly
Senior Editor

SAN JOSE, Calif. — Novell, Inc. next month is expected to beef up its internetworking line, combining its routing and wide-area networking products into a single offering and adding IBM bridging capabilities, to boot.

According to a user currently testing it, the new software-based NetWare Multiprotocol Router Plus 2.1 will have the routing capabilities of Novell's Multiprotocol Router as well as the wide-area connectivity — such as X.25 support — of its NetWare WAN Links product.

Novell said it would make a router-related announcement next month, but neither confirmed nor denied any details.

Like the existing NetWare Multiprotocol Router 2.0, the new version will be a software-only product that runs either within a NetWare 3.11 server or on a separate box running Novell's NetWare Runtime.

It will be able to route Apple Computer, Inc. AppleTalk, Novell Internetwork Packet Exchange (IPX), Internet Protocol, Network Basic I/0 System and Open Systems Interconnection traffic,

(continued on page 58)

E-mail community pushes to simplify X.400 addresses

Vendors, users join to overcome usage barrier.

By Bob Brown
Senior Editor

ATLANTA — Members of the electronic mail community could meet as early as next month at the Electronic Messaging Association's (EMA) annual conference here to agree on a new approach to X.400 addressing.

A proposal is being formalized by a working group of the EMA's Interconnect Committee that could reduce the number of elements in an X.400 address from six or more to as few as two. Another working group will review the plan, determine how to pitch it to the standards committees and articulate implementation guidelines for users and vendors.

Difficulty in addressing X.400 messages has been among the biggest obstacles to widespread adoption of the technology. E-mail administrators and vendors have had a tough time selling X.400, especially since end users have found the option-laden X.400 addressing scheme less than intuitive.

"Once my [end users] reach the point of having to deal with X.400 addressing as it is today, they become frustrated and stop," said Don W. Price, tech-

(continued on page 6)

Fore Systems rolls out its 1993 ATM product strategy

By Skip MacAskill
Senior Writer

PITTSBURGH — Hoping to maintain its lead in the ATM LAN market, Fore Systems, Inc. this week will lower product prices and announce plans to broaden its line with the introduction of new Asynchronous Transfer Mode interfaces and management wares.

The company said it will attack the pricing issue from multiple fronts, starting by reducing the cost of its 16-port ForeRunner ASX-100 ATM switch by 40% to $2,995 per port. That will bring it in line with the $2,495 per-port cost of its 64-port ForeRunner ASX-100 SwitchCluster.

Both products are expected to fall under $2,000 per port by the end of 1994, according to Mark Juliano, director of marketing. "ATM prices are getting down into the FDDI range, so users may be inclined to hold off on implementing FDDI plans and try ATM out," he said.

This week, the company will also knock $1,000 off the price of its ATM workstation interfaces, except those for SBus-based machines.

In an effort to further reduce

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Briefs

Pssst. You guys make the list? *Business Week* this week will unveil its list of the 100 hottest small companies in the U.S., and a number of network vendors have made the cut. Xircom, Inc. leads the pack with a No. 4 ranking, followed by companies such as Data Race, Inc. at No. 24, U.S. Robotics, Inc. at 40, Xyplex, Inc. at 62, Chipcom Corp. at 69 and CrossComm Corp. at 89. Firms needed revenue of $10 million to $150 million and a market value greater than $1 million. Rankings are based on a three-year period and take into account growth in sales, earnings and return-on-invested capital.

Crossing the t's and dotting the i's. Cabletron Systems, Inc. and Artel Communications Corp. are days away from signing a joint marketing agreement that will allow Cabletron to incorporate Artel's Ethernet switching technology into its product line. Details to be ironed out include whether Cabletron will resell Artel's Galactica switching hub as part of its line, integrate that technology via a module or both. Both companies declined comment.

Banyan, IBM tie the knot. Banyan Systems, Inc. and IBM last week announced they will work together to develop a version of Banyan's VINES network operating system to run on IBM's RISC System/6000 machines and other IBM systems supporting IBM's AIX version of Unix. Both companies will market, sell and support the product when it becomes available in the first quarter of next year.

It really does work together. Thirteen vendors will get together June 2 at Boston's Westin Hotel to conduct the industry's largest Fiber Distributed Data Interface-over-copper interoperability demonstration. The companies will link their FDDI products using different length shielded and unshielded twisted-pair wire. The event is being hosted by Motorola, Inc. Other participants include Cabletron Systems, Inc., Crescendo Communications, Inc., Digital Equipment Corp., SynOptics Communications, Inc. and 3Com Corp.

Retix preps X.400 NLM. Retix next week plans to announce a Novell, Inc. NetWare Loadable Module version of its X.400 Message Transfer Agent software. Retix X.400 for Global MHS will feature directory synchronization, among other features, according to an industry observer familiar with the product.

Frame relay triumvirate outline plan. AT&T, Cisco Systems, Inc. and StrataCom, Inc. last week submitted a document to the ATM Forum outlining techniques for mapping frame relay switching and transmission to Asynchronous Transfer Mode (ATM). The document details how AT&T, Cisco and StrataCom plan to implement ATM and frame relay standards to achieve interoperability between frame relay and ATM devices and networks. The companies announced plans last January to develop a gateway in the first half of 1994, called ATM-to-frame relay interworking, to accomplish this.

Tivoli to develop NT enterprise management tool. Tivoli Systems, Inc. last week said it will develop a version of its distributed systems management software for the Window NT operating system. The Tivoli Management Environment, which is now tailored for Unix systems, will allow administrators to manage, configure, change, monitor and enforce security on NT platforms distributed across enterprise networks. The product will be available later this year.

CONTACTS

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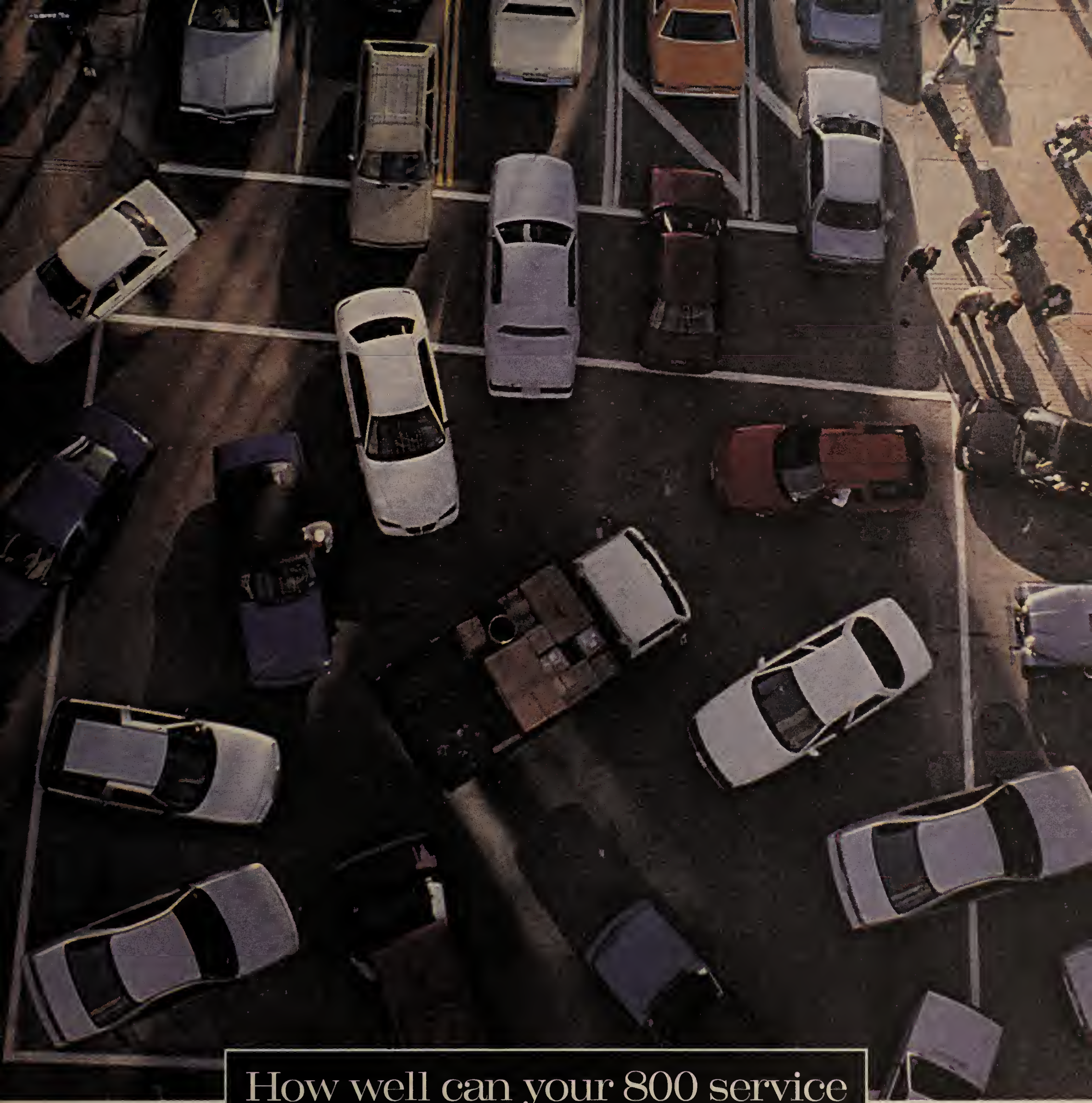

How well can your 800 service control heavy traffic?

When too many customers call your business simultaneously, they can turn your smoothly-flowing 800 traffic into gridlock. Callers can't get through. And rather than stay on hold indefinitely, they could choose to take their business elsewhere.

Fortunately, Sprint has devised a number of alternate routes to make sure you get every call in the midst of busy 800 traffic. For instance, our 800 Call Director℠ features a unique graphic interface that lets you redirect your 800 traffic with point-and-click convenience. This makes it easy to reroute calls, even as your call center is reacting to its own version of rush hour.

Another Sprint solution allows you to have your incoming calls routed automatically, not only to the nearest call center, but to the next available agent. The result is maximized productivity and minimized customer disconnects.

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IBM, BPSI software offers wireless access to AS/400

Wireless Datacom '93 debut lets minicomputer manage transactions with portable devices.

By Ellen Messmer
Senior Correspondent

SAN JOSE, Calif. — IBM and Business Partner Solutions, Inc. (BPSI) last week jointly announced software to link the IBM AS/400 minicomputer with a variety of hand-held devices via public and private wireless data communications and paging services.

The Application System/400 Mobile Network Access line of software, announced at the Wireless Datacom '93 conference here, was developed by BPSI and licensed to IBM. It consists of two products, PagerPac 400 and RadioPac 400, designed to allow the AS/400 to manage transactions with portable devices.

PagerPac 400 supports one-way wireless communications through public and private pager services. RadioPac 400 supports two-way communications between the AS/400 and mobile data users on the ARDIS Co. and RAM Mobile Data, Inc. networks, as well the Canadian Bell ARDIS and Cantel networks.

When tailored to fit specific networks, RadioPac can also transfer data between the incompatible RAM and ARDIS networks, said Brian Derr, president and chief executive officer of Westmont, Ill.-based BPSI.

Both AS/400 Mobile Network Access products work with any text-capable pager or MS/DOS-based computing device from GRiD Systems Corp., Hewlett-Packard Co., IBM, Motorola, Inc., NCR Corp. and Telxon Corp., said Glenn Van Benschoten, AS/400 system manager at IBM application business systems.

With the AS/400 acting as a server, these mobile clients can access enterprise network information and business applications remotely, Van Benschoten said.

WIRELESS DATACOMM '93
EXPOSITION & CONFERENCE

According to Dry Storage Corp. and Southeast Alabama Medical Center, two of the first users of the AS/400 wireless server software, the integration of wireless data communications into their networks proceeded smoothly.

Dry Storage, a Des Plaines, Ill.-based company with warehousing and trucking operations nationwide, is using the product to let truckers and warehouse personnel input job data to hand-held devices, replacing its paper-based system.

RadioPac lets truck drivers transfer delivery data from Telxon hand-held devices via the ARDIS net to any of the five AS/400s in the Dry Storage net. Using electronic data interchange, the information is then automatically transferred to customer sites so they immediately know the status of their deliveries. Also, Dry Storage forklift operators use the Telxon devices to update the AS/400 with shelf stock and warehouse inventory data.

Dennis Waliczek, vice president of information services at Dry Storage, said the system has reduced paperwork and shaved almost 20 hours off the time it takes to inform customers of shipment deliveries.

"Does wireless really work? Yes, it does," Waliczek said. "But it's important how you design your network so you don't use excessive airtime."

The AS/400 Mobile Network Access software is available now from BPSI and will be sold by IBM in August. PagerPac 400's base cost is $4,000, while RadioPac 400's is $20,000. BPSI can be reached at (708) 323-9292 and IBM at (800) 426-4266.

Other vendors are also jumping on the bandwagon. Orion Network Solutions, Inc., the Willowdale, Ontario-based developer of IBM communications software, will support AS/400 Mobile Access systems in its messaging software. And IMREX Computer Systems, Inc., a Great Neck, N.Y.-based supplier of applications software for field service and sales, said it will integrate support for AS/400 Mobile Network Access into its ILS/400 database software so users can access the database via wireless services.

IBM braces LAN support with new OS/2, servers

By Michael Cooney
Senior Editor

NEW YORK — IBM last week ramped up its local-area networking support with an improved version of OS/2, new low-end Unix LAN servers and high-speed LAN adapters for the Application System/400.

The latest release, Version 2.1 of IBM's OS/2 strategic operating system, contains little in the way of direct networking enhancements. But IBM is counting on OS/2 2.1's improved performance to provide more power for key systems running atop the new version, including LAN Server, LAN NetView and Communications Manager/2.

How much OS/2 2.1 will improve the performance of those applications has not been documented yet, said Walter Casey, director of marketing for IBM's Personal Software Products business. Casey added that OS/2 2.1 runs DOS and Windows applications more efficiently than past versions and supports improved graphics and multimedia capabilities.

Analysts said the improved performance will be needed as OS/2's role in IBM's networking strategy is broadened.

"IBM will be optimizing all its OS/2 platforms, such as LAN NetView, to take advantage of the improved performance of OS/2 2.1," said Dick Boyle, a program director with Gartner Group, Inc., a consultancy in Stamford, Conn. "Performance of those applications will be critical, and IBM seems to have taken care of that issue with this release."

The new release of OS/2 will be available June 14 and is priced at $249. Current OS/2 users can receive a $30 rebate for upgrading to the new version by contacting IBM.

IBM also announced two low-end AIX-based RISC System/6000 servers, including a new deskside server, the POWERserver 550L and the desktop POWERserver 23S. The boxes are built on the IBM and Motorola, Inc. PowerPC chip.

The POWERserver 550L is a 42-MHz box with 32M bytes of memory and a 2G-byte disk drive. It comes with an integrated Ethernet adapter, a CDROM

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Correction: In "Cisco offers parcel of enterprise upgrades," (*NW,* May 17), the convergence time of Cisco Systems, Inc.'s Enhanced IGRP was incorrectly stated. Enhanced IGRP will let Cisco routers route around net failures in about one second in a best-case scenario, or about 15 seconds in a worst case.

Object vendors ally on distributed computing apps

By Wayne Eckerson
Senior Editor

SAN DIEGO — Seeking to ease the burden of developing distributed applications, a group of vendors and systems integrators have banded together to foster interoperability among their object-oriented technologies.

Introduced last week, the Distributed Object Access Alliance currently comprises six vendors and two systems integrators that have committed to joint technology exchanges and marketing initiatives, in addition to other things.

Their goal is to provide corporate and professional developers with a suite of interoperable products, ranging from databases to C++ code generators and compilers, for building distributed systems using object-oriented development tools.

"People are accepting the idea that object orientation is the way to build distributed applications, but that requires a whole new tool set," explained Christopher Keene, president of Persistence Software, Inc., an alliance member. "Customers want vendors to do a lot of the integration work to make these tools interoperate."

Other members of the alliance are: Angeli Systems Corp., Associative Design Technology (ADT), Expersoft Corp., Objectivity, Inc., Logicon Strategic and Information Systems, Inc., Lucid, Inc. and MRJ, Inc.

The driving force behind the alliance is Expersoft, which markets an application development tool based on C++, called XShell, which enables developers to build distributed applications as if they were building a stand-

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Microsoft builds support to ensure smooth NT sailing

By Fredric Paul
Senior Editor

ATLANTA — While making the final preparations for the official unveiling of Windows NT here today, Microsoft Corp. last week previewed new support strategies designed to remove a potential roadblock to the success of NT in enterprise nets.

Microsoft's two-pronged support strategy combines direct support services and a series of partnerships with more than 2,000 resellers, systems integrators and consultants, including some of the biggest names in the business.

"[Microsoft] woke up one morning and realized that they didn't have the time or the willingness and expertise to build a global support infrastructure," said Lane Nonnenberg, group marketing manager for Worldwide Customer Support Operations at Hewlett-Packard Co., one of the newly signed support providers. "You'd be committing business suicide if you went in [to Fortune 500 companies] without the support issue locked up."

The issue is especially thorny for Microsoft, which built its success largely on sales to end users, not network managers.

"Support has always been a major weakness [for Microsoft]," said Stan Schatt, director of local-area network services at InfoCorp, a market research firm in Santa Clara, Calif. But like the dinosaurs in the new movie *Jurassic Park,* Microsoft is learning from its mistakes. "They're getting smarter and smarter, and they're still just as big and mean," he said.

Walker

Microsoft's direct support effort will consist of electronic, automated and phone support. The heart of the new program is per-incident telephone support that is available around the clock, seven days a week. Services will be billed at a flat rate, no matter how long or how many calls it takes to resolve the problem.

Two special options will also be offered. Professional support includes annual billing, response within 24 hours for most problems and response within one hour for downed servers. The top-of-the-line Premier option adds a designated Microsoft senior engineer and response within four hours.

The company has not yet set support fees, but Sam Jadallah, general manager of corporate support at Microsoft, said the per-incident price would be less than Novell, Inc.'s $175 fee for similar NetWare support. As an initial safety net, Microsoft will provide new users with 30 days of free

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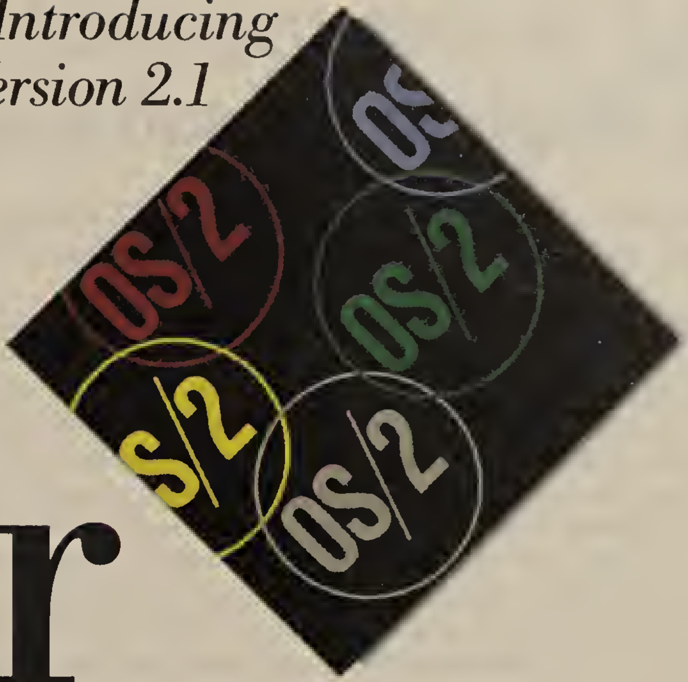

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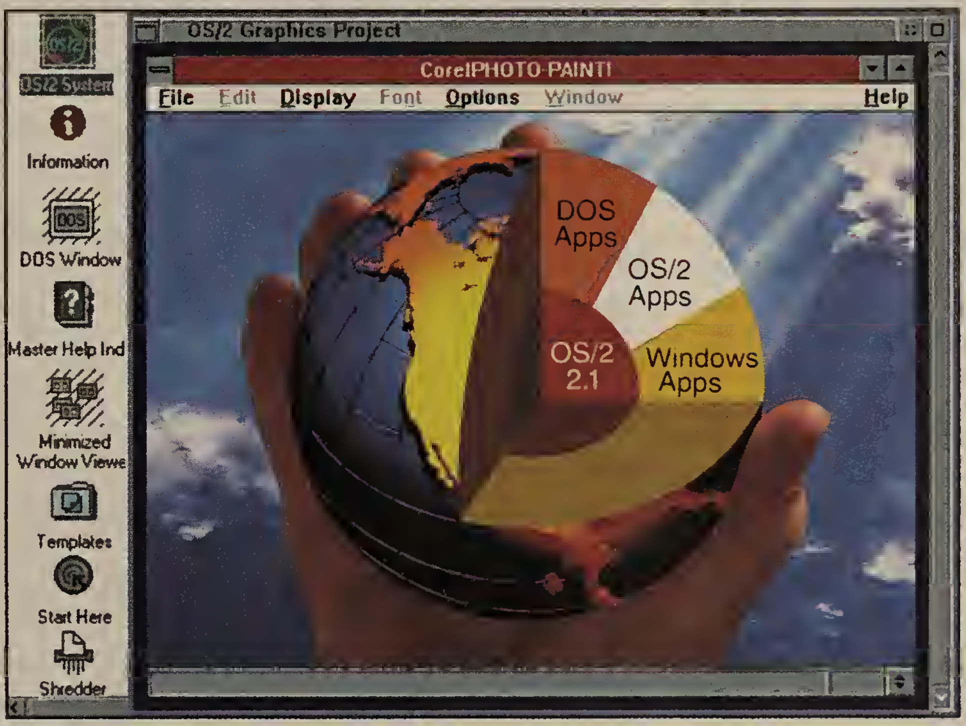

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Madge to ship upgraded LAN adapter card software

Pack features multiprotocol on-board processing, improved fault tolerance in NetWare environments.

By Christine Burns
Staff Writer

SAN JOSE, Calif. — Madge Networks, Inc. last week unveiled a new release of its adapter card software that offers improved reliability in NetWare environments and simultaneous support for a maximum of four protocols.

Smart LAN Support Software Release 4.0, for use with Madge Networks' line of Smart 16/4 Ringnode token-ring adapters, supports up to four networking protocols on a single adapter board. It also features a new concept in fault tolerance, dubbed server card mirroring, whereby one adapter can back up another in a Novell, Inc. NetWare server.

Melissa Morales, an analyst with the consultancy Datapro Information Services Group in Delran, N.J., said the Release 4.0 features are unique. "In my research, I haven't found another vendor covering these," she said.

Central to Release 4.0 is the new Smart II Software architecture, which provides concurrent on-board processing of up to four different protocols, up from two.

The architecture also incorporates a new Smart protocol module containing Novell's Open Data Link Interface (ODI), which enables different types of packets to be sent over the same wire. ODI gives the module simultaneous support for Novell's Internetwork Packet Exchange (IPX) protocol plus IBM's Logical Link Control (LLC) and Network Basic I/O System without using slower complex mapping modules.

Release 4.0's server card mirroring feature is provided via a new version of its NetWare 3.X driver. Smart 16/4 Ringnodes are installed in NetWare servers in pairs connected to the same ring; one card acting as a primary connection, while the other acts as a hot standby. If the primary net connection fails, the driver software will switch over automatically to the standby card.

Server card mirroring is implemented entirely in the driver software and is transparent to NetWare.

Further benefits of the redesigned architecture include as much as a 50% decrease in DOS memory usage, depending on adapter. Release 4.0 also ships with a new utility that guides users through the installation process.

Release 4.0, however, is not designed to support earlier Madge Networks Smart adapter cards that operate only at 4M bit/sec, such as the Smart AT Ringnode. Also, Release 4.0 does not support the Smart 16/4 Pocket Ringnode.

Kasey Kasemodel, an analyst with Mazda Services, Inc., which has been beta-testing Release 4.0 since April, said he was impressed with the product overall, especially the merits of the multiple on-board processing.

"We run a lot of 3270 and AS/400 sessions and we use a Gupta [Corp.] database. And since we are basically NetWare everywhere, being able to layer in NETBIOS and LLC really makes a big difference for us," said Kasemodel.

> "Being able to layer in NETBIOS and LLC really makes a big difference for us."
>
> ▲▲▲

Smart LAN Support Software Release 4.0 will be shipped with all new Smart 16/4 Ringnodes token-ring adapters next month. The adapters will range in price from $745 to $1145. Upgrade packs for existing Smart 16/4 Ringnode users are currently available for free.

Madge Networks: (800) 876-2343.

Users worry over SFT III

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mary server.

Setting up

Virtually all users agreed one of the primary problems with the product is its documentation.

"The installation and setup guide with SFT III is significantly inadequate — it doesn't tell you in what order to load things, or even what to load," said Lewis Shelton, network support engineer at Viewlogic Systems, Inc., based in Marlborough, Mass. "If we were to install it now, we'd have to hire someone to do it. And that would be a significant investment at $150 an hour."

According to Bob Young, director of marketing at Novell, with the release of the 4.0 version of SFT III, expected to be available later this year, the documentation will be available on CDROM and will be clearer and easier to use.

The documentation does recommend the two servers be configured alike, and users stressed the importance of this.

"Those machines should be identical — the same chips and everything," said Glenn Fund, president of the Greater Boston Area Novell Users Group. "I'm talking identical twins."

But even with identical servers, there is still room for massive error.

Once all the hardware and drivers are in place, users can mistakenly mirror the servers in the wrong direction, wiping out all information on the primary server.

"It's very easy to make a mistake and mirror the empty machine onto the full machine," Fund said. "In fact, we actually did that by accident. It's really

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IBM pushes envelope

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soft Corp.'s Windows, additional Unix environments, IBM mainframe and mid-range machines, and Apple Computer, Inc.'s Macintosh, sources said.

It will also use a Sockets interface to work with a variety of network transports, including the Transmission Control Protocol/Internet Protocol, Network Basic I/O System and Novell, Inc.'s Internetwork Packet Exchange (IPX).

While IBM plans to market SOM 2.0 as a stand-alone product, sources said the technology will be used to provide underlying distributed services for an object-oriented operating system being developed by Taligent, Inc., which is due in its entirety in 1995.

Taligent, a joint venture of IBM and Apple, is developing higher level services, such as graphics and multimedia features, that will run on top of DSOM, sources said.

SOM 2.0, with its DSOM extension, will conform to the Object Management Group's Common ORB Architecture (CORBA), supporting the specification's static and dynamic interfaces. CORBA currently specifies an application program interface for accessing ORB services, which manage the exchange of messages between objects across a network.

What distinguishes IBM's SOM from object computing technologies offered by other companies is that SOM makes it possible for developers to build binary object-class libraries similar to procedural libraries. Currently, most object vendors deliver object class libraries as source code, which must be recompiled every time a user wants to modify or add an object class.

In addition, SOM's binary object libraries make it possible for object classes developed in different programming languages to interoperate.

"The lack of cross-language support and binary software packaging has held back object-oriented development technology from widespread commercial acceptance," said John Rymer, vice president at Patricia Seybold Group, Inc. in Boston. "SOM gives IBM a large lead over its competitors in delivering state-of-the-art distributed object computing technology."

> SOM makes it possible to build binary object-class libraries similar to procedural libraries.
>
> ▲▲▲

SOM 2.0 will consist of a graphical development tool that enables developers to modify and assemble SOM objects into distributed applications. Beneath the visual programming tool, SOM will support a series of object frameworks — essentially optimized sets of object-class libraries designed to support broad systems functions.

IBM will ship SOM 2.0 with a persistence framework, which defines how SOM objects are stored and retrieved, and a replication framework, which manages concurrent access to SOM objects in a net environment.

Users push to simplify X.400

continued from page 2

nologist at Texaco, Inc. in Tulsa, Okla., and a member of the Interconnect Committee. Simplifying X.400 addresses "is one of the single most important things to getting [X.400] going."

Dan Blum, a principal at the Washington, D.C. consultancy Rapport Communication, added, "It's critical that something happens to simplify X.400 addressing. How else will X.400 compete with the Internet, which already has simple addressing?"

If the Interconnect Committee agrees on a revised address scheme, the group would pitch it to the Consultative Committee on International Telephony and Telegraphy and recommend that users and vendors start adopting it, according to Roberta Myers, chairwoman of the EMA's Interconnect Committee and an MCI Communications Corp. manager.

"We want to come to a consensus," she said. "There has been a lot of frustration building up over the years trying to make a change that everyone can agree on."

Bill Lucas, president of E-mail directory services provider Vector Directory Services and the Interconnect Committee member who pitched the modified X.400 addressing plan, said his subcommittee is working on a "vision statement" that represents a target for the X.400 messaging industry to shoot for by the year 2000. Between now and then, users and vendors can argue about how to get to this target, he said.

> "It's critical that something happens to simplify X.400 addressing."
>
> ▲▲▲

Currently, most U.S. X.400 addresses include, at minimum, labels for a recipient's country, public network provider, private network system, surname and given name, and a unique identifier. These addresses look similar to: G=John;S=Jones;P=NW;A=ATTMAIL;C=US;DDA:ID=(unique identifier). Under the proposal to be considered by the EMA's Interconnect Committee, the address could be shortened to a private mail domainand "unique user identifier" that could be a phone number or something else left to the discretion of the private mail domain operater, Lucas said. A change to the X.400 standard would most likely be needed to accommodate this.

Lucas made his proposal at an Interconnect Committee meeting in mid-April and was received with enthusiasm, Myers said. "There was more energy devoted to this discussion than I've seen on this topic in my three years on the committee," she said.

Previously, the petroleum and aerospace industries have pitched X.400 addressing solutions, but plans were not simplified addressing enough or got hung up because of the special needs of various organizations.

Lucas will air the proposal again at the EMA's Electronic Messaging '93 show June 14-17.

EMA: (703) 875-8620.

not clear how to do it."

As with the documentation changes for SFT III 4.0, the installation process will be greatly enhanced. "If you look at the installation process with 4.0, you can get a good idea of the enhancements we'll provide [with SFT III for 4.0]," Young said.

Performance dog

Once through the setup, users may be in for more surprises.

"With SFT III, your performance degrades significantly," said Paul Bandrowski, technology manager at Sara Lee Corp., a large Novell site in Chicago. "At 10 users, it worked great; 20 users slows it down slightly; and at 35 users, the system stops 100%."

Bandrowski said the performance problem is caused by the overhead required to keep the two servers synchronized. Keeping LANs small can solve the problem, although the size goes down significantly for processor-intensive applications.

"If you want SFT III on your Oracle database, performance dies in the twenties of users," Bandrowski said.

Novell's Young denied performance problems claims.

"We sell a 250-user version of SFT III [for NetWare 3.11]. In fact, I know of one customer running 1,000 users off an SFT III 3.11 server," he said. "Even with the highest end database applications, I bet you can have as many as 500 users" on the SFT III 4.0 version.

Despite all its drawbacks, users agreed SFT III is critical for LANs that need a high-level of fault tolerance.

In fact, Edwin Wilk, network manager for WHDH-TV in Boston, said his company relies on the 3.11 version of SFT III so heavily that it will not upgrade to NetWare 4.0 until SFT III for 4.0 is available.

And Novell is expected to fix many of the problems with SFT III for 3.11 for the 4.0 version.

"Novell is working on making the interface more intelligent to humans — to let them know which way the mirroring is going," said one user familiar with Novell's SFT III for 4.0 plans.

Novell also plans to provide a way to notify the administrator if one of the servers fails, the user added. With the NetWare 3.11 version, if one server fails, a message is displayed on the server console, which does no good if the servers are locked away in a separate room, as they most likely would be in a mission-critical environment.

Young added that the 4.0 version of SFT III will also include support for Apple Computer, Inc. Macintosh and Unix clients, which are not currently supported under the 3.11 version.

Unfortunately, the SFT III version for NetWare 3.11 is expected to remain unchanged, at least now. ◘

Microsoft builds NT support

continued from page 4

phone support for setup and installation during the remainder of this year. This support does not cover Windows NT Advanced Server and only operates from 6 a.m. to 6 p.m., Monday through Friday.

Microsoft will augment its telephone support with on-line support via Compuserve, the Internet and its own MS Online service. Automated support services such as the Microsoft Developers Network, the ability to log on to company databases from the Internet, Faxback and phone-based Fast Tips round out the direct options.

Although the firm has trained 300 employees to support NT, that figure is dwarfed by the massive support organizations mustered by hardware manufacturers.

So far, the company has announced support alliances with Computerland, E.D.S. Computer Services, HP, Ingram Micro, Inc., MicroAge Computer Centers, Inc., NCR Corp., SystemsHouse, Inc., Tech Data Corp., US Connect, Inc. and others. Digital Equipment Corp. will announce its support commitments this week, along with support for Windows NT on its Alpha chip.

"[Additional] significant announcements will be coming from our partners in the next few weeks," said Dwayne Walker, director of Windows NT and networking products at Microsoft.

However, all this will not be an issue for some time. Microsoft's target date for shipping Windows NT remains the end of June, Walker said, but the company is now advising customers to expect the product within 90 days.

Walker also updated NT's hardware requirements. The vast majority of NT users will run the operating system on computers equipped with 486SX and above chips, he said, and will be "very happy in 16M bytes of RAM." The official minimums include a 386 processor, 12M bytes of random-access memory and 70M bytes of disk space. ◘

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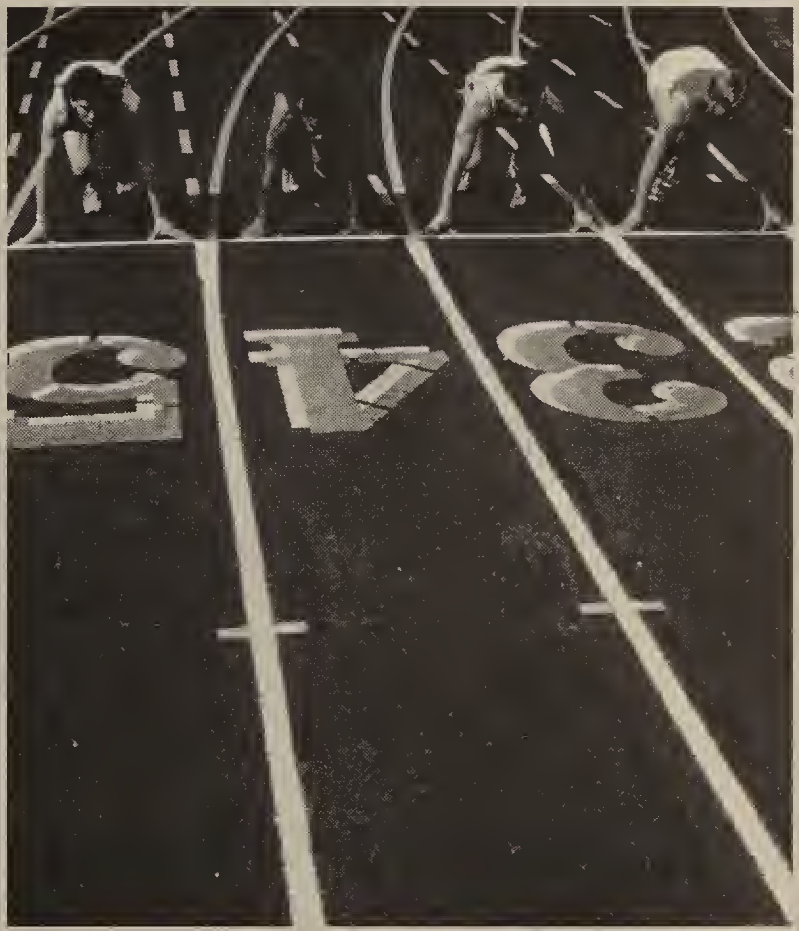

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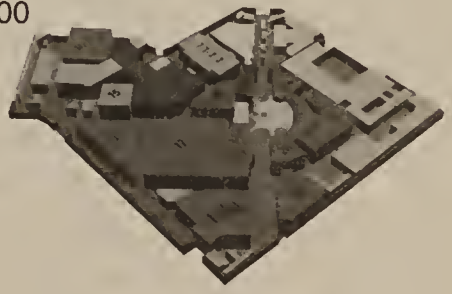

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FTD had a datacomm problem—a conflict between the economics of sticking with installed equipment and the benefits of improving technology for new installations.

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1 Industry: (check one only)

- 01. ☐ Manufacturers (other than Computer/Communications)
- 02. ☐ Finance/Banking
- 03. ☐ Insurance
- 04. ☐ Real Estate
- 05. ☐ Healthcare Services
- 06. ☐ Legal
- 07. ☐ Hospitality
- 08. ☐ Retail/Wholesale Trade/Business Services
- 09. ☐ Transportation
- 10. ☐ Utilities
- 11. ☐ Education
- 12. ☐ Process Industries (Mining/Construction/ Petroleum Refining/Agriculture/Forestry)
- 13. ☐ Government, State/Local
- 14. ☐ Government, Federal
- 15. ☐ Military
- 16. ☐ Aerospace
- 17. ☐ Consultants (Independent)
- 18. ☐ Carriers
- 19. ☐ Interconnects
- 20. ☐ Manufacturers (Computer/Communications)
- 21. ☐ VAR/VAD/VAN/ Systems Houses
- 22. ☐ Distributors, Computer Related
- 23. ☐ Distributors, Communications Related
- 24. ☐ Other____________________

2 What is your job function? (check one only)

NETWORKING MANAGEMENT
1. ☐ Networking Mgmt.
2. ☐ LAN Mgmt.
3. ☐ Datacom/Telecom Mgmt.
4. ☐ Engineering Mgmt.

MIS MANAGEMENT
5. ☐ MIS, IS, IT Mgmt.
6. ☐ Engineering Mgmt.

CORPORATE MANAGEMENT
7. ☐ Corporate Mgmt. (CIO, CEO, Pres., VP, Dir., Mgr., Financial Mgmt.)

8. ☐ Consultant (Independent)

9. ☐ Other____________________

3 My responsibilities include: (check one only)

1. ☐ LANs/ Internetworking/ WANs
2. ☐ LANs/ Internetworking
3. ☐ LANs
4. ☐ WANs
5. ☐ None

4 What is the total number of sites for which you have purchase influence? (check one only)

1. ☐ 100+
2. ☐ 50 - 99
3. ☐ 20 - 49
4. ☐ 10 - 19
5. ☐ 2 - 9.
6. ☐ 1
7. ☐ None

5 What is your scope and involvement in purchasing decisions for network products & services for your enterprise?

A. Scope
(check one only)
1. ☐ Corporatewide
2. ☐ Multienterprise (consultants)
3. ☐ Departmental

B. Involvement
(check all that apply)
1. ☐ Recommend/Specify
2. ☐ Approve
3. ☐ Evaluate

4. ☐ None (A or B)

6 Check all that apply in Columns A and B:

A I am involved in the purchase of the following products/services.
B I plan to purchase the following products/services in the next year.

Involved A	Plan to Purchase B	
		LOCAL-AREA NETWORKS
☐	☐	01. Local-Area Networks
☐	☐	02. LAN Servers
☐	☐	03. LAN Operating Systems Software
☐	☐	04. Superservers
☐	☐	05. Data Base Servers (Oracle, Sybase, etc).
☐	☐	06. Terminal Servers
☐	☐	07. LAN Services
☐	☐	08. LAN Storage Devices (optical, tape, disk, etc,. including backup systems)
☐	☐	09. Network Test Equipment
☐	☐	10. Hubs
☐	☐	11. Cables, Connectors, Baluns
☐	☐	12. UPS
☐	☐	13. Network Adapter Boards
☐	☐	14. Peer-to-Peer LANs
☐	☐	15. Wireless LANs
☐	☐	16. SNMP Network Management
☐	☐	17. ATM (Asynchronous Transfer Mode)
A	**B**	**INTERNETWORKING**
☐	☐	18. Bridges
☐	☐	19. Routers
☐	☐	20. Gateways
☐	☐	21. Bridge/Routers
☐	☐	22. Hubs
☐	☐	23. Intelligent Hubs
☐	☐	24. Communications Servers

Involved A	Plan to Purchase B	
		COMPUTERS/PERIPHERALS
☐	☐	25. Micros/PCs
☐	☐	26. Minis
☐	☐	27. Mainframes
☐	☐	28. Pen-Based
☐	☐	29. Laptops
☐	☐	30. Workstations
☐	☐	31. Image Processing Workstations
☐	☐	32. Front-End Processors
☐	☐	33. Terminals
☐	☐	34. Printers
☐	☐	35. Cluster Controllers
☐	☐	36. Fax Machines
☐	☐	37. X-Terminals
A	**B**	**SOFTWARE/APPLICATIONS**
☐	☐	38. Network Management
☐	☐	39. Micro to Mainframe
☐	☐	40. Security
☐	☐	41. Communication/Terminal Emulation
☐	☐	42. Word Processing
☐	☐	43. Operating Systems
☐	☐	44. Business Applications (Finance/Mfg/HR)
☐	☐	45. Applications Development
☐	☐	46. Data Base Management
☐	☐	47. Spreadsheet
☐	☐	48. Groupware
☐	☐	49. EDI
☐	☐	50. E-Mail
☐	☐	51. Windows/Graphical User Interface
☐	☐	52. 4GL/Development
☐	☐	53. Multimedia
☐	☐	54. Graphics
☐	☐	55. Utilities
A	**B**	**WIDE-AREA NETWORK EQUIPMENT/SERVICES**
☐	☐	56. Modems (9.6K bps and over)
☐	☐	57. Modems (under 9.6K bps)
☐	☐	58. T-1
☐	☐	59. T-3
☐	☐	60. Fractional T-1
☐	☐	61. Data Switches
☐	☐	62. SMDS
☐	☐	63. ATM (Asynchronous Transfer Mode)
☐	☐	64. Matrix Switches
☐	☐	65. Packet Switches
☐	☐	66. Protocol Converters
☐	☐	67. Diagnostic/Test Equipment
☐	☐	68. DSU/CSUs
☐	☐	69. Microwave
☐	☐	70. Fax Boards/Modems
☐	☐	71. VSAT
☐	☐	72. Fiber Optic
☐	☐	73. Satellite
☐	☐	74. ISDN
☐	☐	75. PBXs (over 1000 lines)
☐	☐	76. PBXs (under 1000 lines)
☐	☐	77. Automatic Call Distributors
☐	☐	78. Voice Messaging Systems
☐	☐	79. Videoconferencing Systems
☐	☐	80. Voice Response/Processing
☐	☐	81. Switched Voice
☐	☐	82. Dedicated Leased Line
☐	☐	83. Switched Data
☐	☐	84. Centrex
☐	☐	85. E-Mail/On-Line Information
☐	☐	86. Image Processing
☐	☐	87. Audio Teleconferencing
☐	☐	88. Local Services
☐	☐	89. WATS MTs
☐	☐	90. International
☐	☐	91. Virtual Networks
☐	☐	92. Frame Relay
☐	☐	93. Value Added Services
☐	☐	XX None of the above (1-93)

7 What is the total number of A: LANs B: Workstations/Nodes in your entire organization?

	LANs A		Workstations/ Nodes B
1.	☐	5,000+	☐
2.	☐	1,000 - 4,999	☐
3.	☐	100 - 999	☐
4.	☐	50 - 99	☐
5.	☐	10 - 49	☐
6.	☐	9 or Less	☐

8 Which of the following network platforms are currently installed/planned in the next year?

Present	Planned	
		NETWORK ARCHITECTURES
☐ 01.	☐	SNA
☐ 02.	☐	DECNET
☐ 03.	☐	MAP/TOP
☐ 04.	☐	TCP/IP
☐ 05.	☐	DCA (Unisys)
☐ 06.	☐	X.25
☐ 07.	☐	NOVELL IPX/SPX
☐ 08.	☐	APPC/APPN/LU 6.2
☐ 09.	☐	NETBIOS
☐ 10.	☐	OSI
☐ 11.	☐	APPLETALK
☐ 12.	☐	OTHER____________________
		LAN OPERATING SYSTEM
☐ 13.	☐	LOCALTALK (APPLETALK)
☐ 14.	☐	BANYAN (VINES)
☐ 15.	☐	DCA (IRMALAN)
☐ 16.	☐	DCA (10-NET)
☐ 17.	☐	IBM (LAN SERVER)
☐ 18.	☐	IBM (PC LAN PROGRAM)
☐ 19.	☐	MICROSOFT (LAN MANAGER)
☐ 20.	☐	UNGERMANN-BASS (NET/1)
☐ 21.	☐	NOVELL (NETWARE, 2.X, 3.X, 4.X)
☐ 22.	☐	PROTEON (PRONET)
☐ 23.	☐	SITKA (TOPS)
☐ 24.	☐	3COM (3+, 3+OPEN)
☐ 25.	☐	ARTISOFT (LANTASTIC)
☐ 26.	☐	HAYES (LANSTEP)
☐ 27.	☐	DEC (PATHWORKS)
☐ 28.	☐	OTHER____________________
		LAN ENVIRONMENT
☐ 29.	☐	4M TOKEN RING
☐ 30.	☐	16M TOKEN RING
☐ 31.	☐	ARCNET
☐ 32.	☐	ETHERNET
☐ 33.	☐	STARLAN
☐ 34.	☐	FDDI
☐ 35.	☐	LOCALTALK
☐ 36.	☐	10BASE-T
☐ 37.	☐	OTHER____________________
		OPERATING SYSTEM
☐ 38.	☐	DOS
☐ 39.	☐	UNIX/XENIX/AIX
☐ 40.	☐	OS/2
☐ 41.	☐	OS/2 2.X
☐ 42.	☐	MVS
☐ 43.	☐	VM
☐ 44.	☐	VMS
☐ 45.	☐	MACINTOSH
☐ 46.	☐	WINDOWS
N/A 47.	☐	WINDOWS NT
☐ 48.	☐	X WINDOWS
☐ 49.	☐	OTHER____________________

9 For which areas outside of the U.S. do you have purchase influence? (check all that apply)

1. ☐ Europe
2. ☐ Asia
3. ☐ South America
4. ☐ Australia
5. ☐ Middle East
6. ☐ None

10 Which of the following hardware platforms is installed/planned in your company? (check all that apply)

	Mainframes Currently Installed	Planned Next Year	Minis Currently Installed	Planned Next Year
01. DEC	☐	☐	☐	☐
02. IBM	☐	☐	☐	☐
03. AMDAHL	☐	☐	☐	☐
04. AT&T	☐	☐	☐	☐
05. BULL HNIS	☐	☐	☐	☐
06. DATA GENERAL	☐	☐	☐	☐
07. HP	☐	☐	☐	☐
08. TANDEM	☐	☐	☐	☐
09. UNISYS	☐	☐	☐	☐
10. OTHER__________	☐	☐	☐	☐

MICROCOMPUTERS (fill in the numbers)	NUMBER INSTALLED	NUMBER PLANNED NEXT YEAR
11. MACINTOSH 20, 30, 40		
12. MACINTOSH OTHER		
13. PCs BASED ON 80586	N/A	
14. PCs BASED ON 80486		
15. PCs BASED ON 80386		
16. PCs BASED ON 80286		
17. PCs BASED ON 8086/8088		
18. RISC / UNIX BASED WKSTNS		
19. OTHER		

11 Estimated value of networking equipment and services:

A. Which you helped specify, recommended or approved in the last year?
B. Which you plan to help specify, recommend or approve in the next year?

A		B	
☐	1.	☐	$100 million and over
☐	2.	☐	$50 - $99.9 million
☐	3.	☐	$25 - $49.9 million
☐	4.	☐	$20 - $24.9 million
☐	5.	☐	$10 - $19.9 million
☐	6.	☐	$5 - $9.9 million
☐	7.	☐	$1 - $4.9 million
☐	8.	☐	$500,000 - $999,999
☐	9.	☐	$499,999 or less

12 Estimated gross annual revenue of your entire company/institution: (check one only)

1. ☐ Over $10 billion
2. ☐ $1 to $9.9 billion
3. ☐ $500 to $999.9 million
4. ☐ $100 to $499.9 million
5. ☐ $50 to $99.9 million
6. ☐ $10 to $49.9 million
7. ☐ $5 to $9.9 million
8. ☐ $4.9 million or less

13 Estimated number of employees for your entire corporation:

1. ☐ Over 10,000
2. ☐ 5,000 - 9,999
3. ☐ 2,500 - 4,999
4. ☐ 1,000 - 2,499
5. ☐ 500 - 999
6. ☐ 499 or less

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Worth Noting

"Digital Equipment Corp. has done all of us a favor by coming out with DECnet/OSI."

George Khater
Senior product marketing manager
Process Software Corp.
A Framingham, Mass., maker of
TCP/IP software for DEC
environments

Data Packets

Answer Computer, Inc. of Sunnyvale, Calif., brought out a text retrieval system for its Apriori help desk system and an interface to IBM's Information/Manager (Info/Man) management software.

The text retrieval system, called TexTracer, provides access to archived and on-line information, regardless of its format or origin.

The Info/Man interface allows help desk personnel to access Info/Man resources on their IBM mainframes from Apriori local-area network clients and servers.

The Info/Man interface costs $20,000 and is available now.

Answer: (800) 677-2679.

Larse Corp. will resell **Clear Communications Corp.**'s Clearview Surveillance System for monitoring the quality of T-1 and T-3 circuits. Clearview also provides systems administration, configuration management and alarm reporting for multivendor transmission equipment.

Larse will resell a version of Clearview that can manage Larse's T-1 Network Diagnostic System, Split-T fractional T-1 access multiplexer, and Access-T multiport and multiline data service unit/channel service units.

Clearview is available now from Larse, but pricing was not available.

Larse: (408) 988-6600. ◪

Net mgmt., file-transfer products on Legent agenda

Offer Windows-based monitors, TCP/IP support.

By Michael Cooney
Senior Editor

PHOENIX — At its annual user conference here, Legent Corp. rolled out a suite of products designed to consolidate its systems and network management products as well as enhance its multivendor file-transfer capabilities.

The new products included Windows versions of the firm's network and performance monitors, in addition to Transmission Control Protocol/Internet Protocol support for its XCOM file-transfer product.

In an effort to consolidate network and performance data on a single console, Legent introduced its Paramount platform, which comprises two components: Paramount Data Server and Paramount/PC. The Paramount Data Server resides on an IBM Systems Network Architecture mainframe and gathers management data from Legent systems and network monitors throughout a user's net.

For example, the firm's LANSpy, a local-area net performance monitor, and NetSpy, an SNA device performance monitor, will report LAN and SNA performance data back to the Paramount Data Server. The performance figures are stored in the data server's database for use in historical net performance reports or can be displayed graphically on the Paramount/PC.

Paramount/PC is software that runs on either a DOS or Windows personal computer attached to the Paramount host. It provides a display for data in the Paramount Data Server for real-time monitoring of net devices. Until now, a separate display was required for each of Legent's network performance monitors.

Paramount Data Server collects data from any Legent network and systems performance monitor, plus Landmark Systems Corp.'s TMON net monitor. The next release will support other industry net monitor products.

"Ultimately, we will consoli-

(continued on page 13)

Wall Data software links Windows to SAA sessions

By Jim Duffy
Senior Editor

REDMOND, Wash. — Wall Data, Inc. last week rolled out software that connects Windows workstations to mainframes, minicomputers and workstations via IBM Advanced Program-to-Program Communications sessions.

In all, Wall Data unveiled four new software programs designed to bring the popular Microsoft Corp. Windows environment into IBM Systems Application Architecture (SAA) networks and allow them to communicate as peers with other SAA systems.

Wall Data's new products are Rumba for the Mainframe APPC Edition, Rumba for the AS/400 APPC Edition, Rumba Tools for APPC and Rumba APPC Client.

Rumba for the Mainframe APPC Edition runs on Windows workstations and allows users to access data and applications on IBM mainframes through APPC.

Rumba for the AS/400 APPC Edition performs the same function for users looking to connect to IBM's Application System/400 minicomputer from a Windows client.

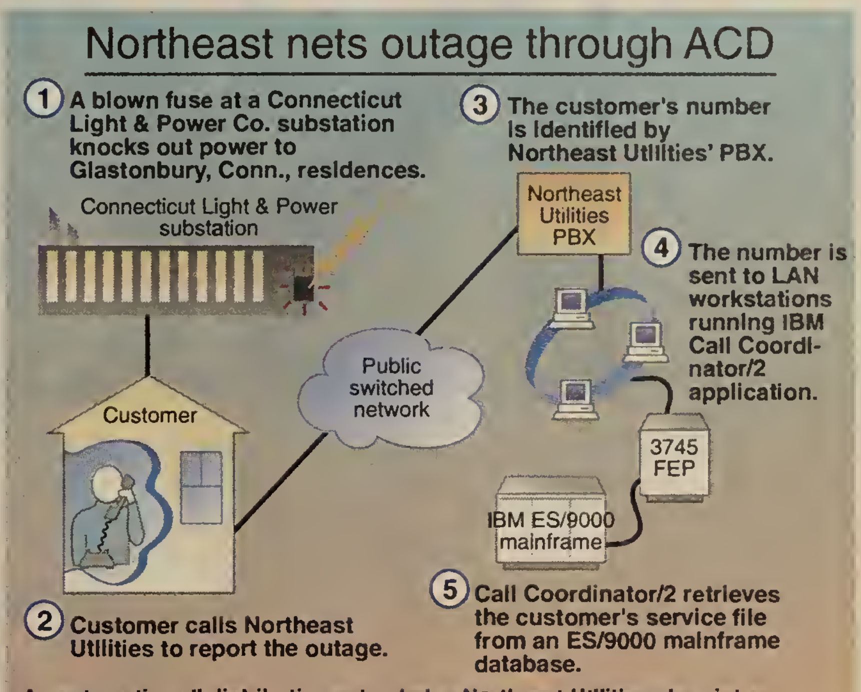
The Rumba APPC Client provides an APPC engine that enables Windows applications to engage in APPC conversations with applications on DOS, OS/2 and RISC System/6000 systems.

Rumba Tools for APPC enables users to write Windows applications that use the aforementioned APPC software to access data on other APPC platforms.

Single-user license fees for Rumba for the Mainframe APPC Edition and Rumba for the AS/400 APPC Edition are $495. The license fees for Rumba Tools for APPC are also $495. These products will be available in June. Pricing for Rumba APPC Client was not available.

Wall Data: (206) 883-4777. ◪

Northeast nets outage through ACD


① A blown fuse at a Connecticut Light & Power Co. substation knocks out power to Glastonbury, Conn., residences.
Connecticut Light & Power substation
Customer
② Customer calls Northeast Utilities to report the outage.
Public switched network
③ The customer's number is identified by Northeast Utilities' PBX.
Northeast Utilities PBX
④ The number is sent to LAN workstations running IBM Call Coordinator/2 application.
3745 FEP
IBM ES/9000 mainframe
⑤ Call Coordinator/2 retrieves the customer's service file from an ES/9000 mainframe database.

An automatic call distribution setup helps Northeast Utilities pinpoint a service outage in 5 minutes.

GRAPHIC BY SUSAN SLATER

SOURCE: NORTHEAST UTILITIES, HARTFORD, CONN.

Nets help Northeast energize New England

Utility company uses a combination of old and new technology to provide power to its customers.

By Jim Duffy
Senior Editor

HARTFORD, Conn. — Northeast Utilities, which owns and operates power plants stretching from Long Island Sound to the Canadian border, uses a mix of old and new network technologies to deliver energy to businesses and residences in the Northeast.

The company's private frame relay backbone links 22 sites and approximately 170 local-area networks outfitted with routers. Longer term, the company plans to install Asynchronous Transfer Mode (ATM) equipment to support bandwidth-hungry applications and its move to distributed computing.

But the firm also relies on tried-and-true technologies, such as an automatic call distributor (ACD) for quick responses to customer inquiries and a 9.6K bit/sec dial-up network for one of its most critical operations: making sure its nuclear power plants comply with the stringent safety parameters mandated by the Nuclear Regulatory Commission.

"We do networking to serve our customers," said John Boyd, supervisor of communications systems at Northeast Utilities. "That's why all of this exists."

The corporate backbone consists of 26 StrataCom, Inc. IPX switches supporting frame relay over 55 T-1 lines, connecting subsidiary utilities and their electric, nuclear, oil and coal plants.

The network links 170 Ethernet and token-ring LANs and about 20 AppleTalk networks to one another and to IBM mainframes and Digital Equipment Corp. VAXes at the data center here. The LANs are connected to the backbone through 36 Cisco Systems, Inc. multiprotocol routers that handle protocols such as IBM's Systems Network Architecture, DEC's DECnet, Local Area Transport, Network Basic I/O System and NETBIOS Extended User Interface, Novell, Inc.'s Integrated Packet Exchange (IPX), Apple Computer, Inc.'s AppleTalk and the Transmission Control Protocol/Internet Protocol.

"All that stuff's out there," Boyd said, referring to the traffic mix. "We don't have the luxury of saying no." The LANs support about 9,000 workstations and terminals and 43 Novell servers.

Alleviating problems

Before installing the router network, Northeast Utilities interconnected its LANs using 145 token-ring and Ethernet bridges. But the bridged network was susceptible to broadcast storms and bottlenecks. Routers were installed to alleviate those problems, and frame relay was

(continued on page 12)

REASON #1

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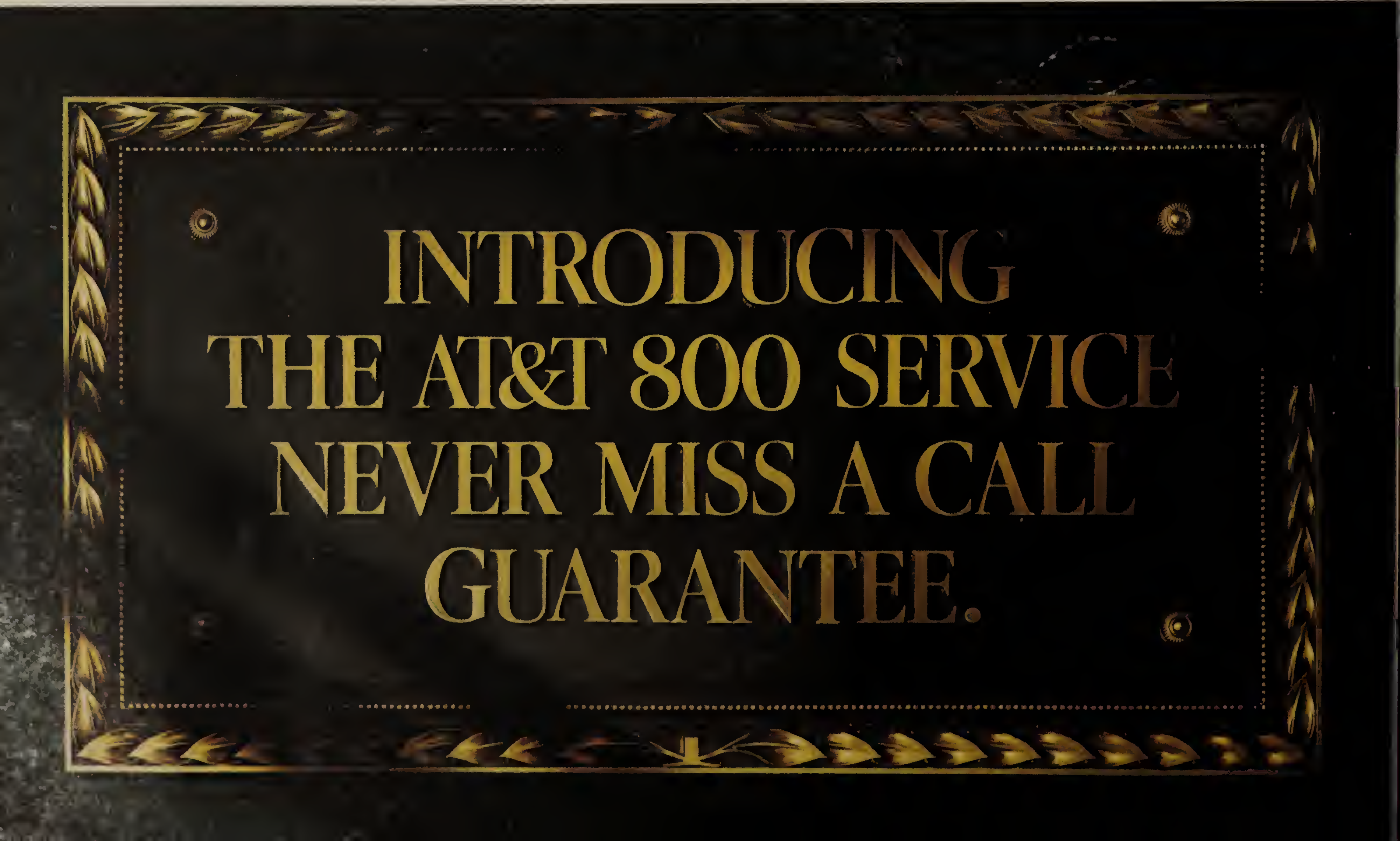

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IBM improves support for TCP/IP on VM mainframes

Also offers VM support for RS/6000 ESCON Adapter.

By Michael Cooney
Senior Editor

RALEIGH, N.C. — IBM has announced a VM version of its 3172 TCP/IP Offload feature that should ease the burden on VM mainframes that handle a large amount of TCP/IP traffic.

IBM Transmission Control Protocol/Internet Protocol Offload is a new feature for VM that promises to save users an average 30% of valuable mainframe cycles by removing TCP/IP processing and local-area network routing functions from mainframes and putting them on an IBM 3172 controller.

IBM has offered an MVS version of the Offload feature since early this year.

The VM TCP/IP Offload feature comprises two pieces of software and the IBM 3172 Interconnect Controller Model 3. For the VM mainframe, Offload requires a Program Temporary Fix, which is software code that includes the necessary updates to enable the Offload feature within VM's TCP/IP program.

On the 3172, the Offload feature runs as an application on top of OS/2 2.0. IBM's TCP/IP Offload feature works only with the 3172 Model 3, which contains an 80386SX-based busmaster card to handle the TCP/IP Offload processing chores.

"TCP/IP takes up a lot of mainframe cycles that could be better used elsewhere," said Daniel Barton, senior associate programmer for IBM's TCP/IP development team. "Offload reduces the VM processor cycles required for TCP/IP communications and increases the computing power available to support users or run applications."

Barton said users should see an average of 30% savings on their mainframe cycles with the new feature. With TCP/IP applications such as File Transfer Protocol, users could see a cycle savings of as much as 50% and with other applications such as Telnet, a 20% savings.

The Offload feature also helps keep unnecessary LAN traffic from traversing the mainframe by filtering out and routing LAN traffic destined for another LAN attached to the 3172 directly to that LAN. Only data destined for the host is allowed to reach it. Without the Offload feature, the mainframe would also have to process the LAN traffic, Barton said.

The feature helps keep unnecessary LAN traffic from traversing the mainframe.

▲▲▲

"Also, if the 3172 is configured with both an Ethernet and Token-Ring board, the Offload feature can take TCP/IP traffic off of one card and route it onto the other — again without going through the mainframe as it does now," he said. "The Offload feature shields the mainframe from a lot of the traffic that would've slowed it down in the past."

The Offload feature code is available free of charge on the VM system. The OS/2 application for the 3172 is also available, but costs $3,150.

Separately, IBM announced VM support for the RISC System/6000 Enterprise System Connection (ESCON) Adapter and native TCP/IP support for VM mainframe channel-to-channel communications.

By supporting the ESCON adapter in the RS/6000, TCP/IP users running RS/6000s can connect directly to ESCON channels on VM mainframes. ESCON is IBM's high-speed fiber-optic mainframe channel architecture that supports speeds up to 17M byte/sec.

TCP/IP Version 2 Release 2 for VM now lets two VM mainframes communicate directly via native TCP/IP using an IBM 3088 channel-to-channel device. In the past, VM mainframes running TCP/IP had to communicate with each other via SNALink software, which would encapsulate TCP/IP data in a Systems Network Architecture session and route it through VTAM. Both features are available as add-ons to TCP/IP for VM Version 2 Release 2.

IBM: (914) 642-5457. ☑

Nets help energize N.E.

continued from page 9

brought in to enhance performance even more, he added.

"With frame relay, we get the touch and feel of eight T-1s for the cost of five," Boyd said, referring to frame relay's ability to burst to speeds above a permanent virtual circuit's committed information rate to fill idle bandwidth on a T-1 trunk. "What that means to the user is eight separate users get the feel as though they all have dedicated T-1 facilities, and, in reality, we've only provisioned five T-1s."

But the company ultimately plans to use ATM in 1995 throughout its networks — from the LAN to the wide-area — to support "higher density" applications such as interactive video and imaging, Boyd said. ATM will help mask the different characteristics of the company's various networks and negate the perception of distance between sites.

"ATM [will] help us integrate a single network across multiple mediums," Boyd said.

Distributed computing

But ATM will provide an infrastructure to support a distributed

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computing environment Northeast Utilities is assembling to harness the processing power of LAN-attached desktops in its enterprisewide network.

Northeast Utilities is currently defining the structure of distributed computing, which will allow the company to complete a task using every available processor on the network.

The firm plans to implement a consistent set of naming, time, directory and security services across its network, said George Millard, manager of Northeast Utilities' information architecture group. Such consistency would alleviate many administrative headaches, he said.

"As you're bringing in products to a heterogeneous environment, you're getting multiple noncompatible directories that are becoming a fairly large administrative task to try to maintain and keep in synchronization with one another," he said.

Distributed computing will also help Northeast Utilities' customer service representatives locate and retrieve customer data faster because all data will be registered in one directory and services to access that data will be the same across the network.

Although it recognizes the need for a consistent set of distributed services, the firm is not sold on the Open Software Foundation, Inc.'s Distributed Computing Environment. Not enough of the company's major vendors, which include Microsoft Corp. and Sun Microsystems, Inc., appear to be backing it, Millard said.

So Northeast Utilities' architecture, once it is defined, will likely include proprietary technology. The company is issuing requests for information to vendors in an attempt to pinpoint which distributed computing strategy — encompassing distributed databases, a set of services and client/server application tools — fits best with the company's plans.

Back to future

While planning for the arrival of advanced technologies, Northeast Utilities is also taking advantage of some bread-and-butter technologies. It is relying on its ACD, for example, to identify areas afflicted by power failures.

When a snowstorm hit southern New England earlier this year, 30,000 calls complaining of the outage poured into Northeast Utilities' customer inquiry center. The ACD helped the firm locate the source of the outage by linking the phone numbers of the incoming calls to information on the caller. This showed that all of the calls were coming from the same vicinity

Five minutes after the calls started coming in, Northeast Utilities was able to pinpoint the trouble spot: a technical problem in a Glastonbury, Conn., substation. In another five minutes, the company set up a voice response unit to inform incoming callers of the problem and the estimated time for service restoral.

Another nonglamorous technology that is critical to the company is a 9.6K bit/sec network used to report the operational status of Northeast Utilities' nuclear power plants.

The network is used to transmit ASCII data about the status of Northeast Utilities' seven nuclear power plants to the company's technical support and emergency operation centers. Data on about 500 safety parameters, including valve positions, temperature of the nuclear core, flow rates and radiation levels, are tabulated every 30 seconds.

Technological support and emergency operations personnel can view two weeks worth of these 30-second "snapshots" online.

File-transfer on Legent agenda

continued from page 9

date management data from multiple data monitors," said Phil Carrai, vice president of product management for Legent.

Also for the SNA environment, Legent announced a Windows version of its N-Vision SNA session manager. N-Vision is a VTAM application that lets users access multiple Legent network or systems management applications on the SNA mainframe.

The Windows version lets users work with multiple applications on screen simultaneously. Until now, N-Vision used a single-screen 3270 display.

Legent also rolled out Windows versions of its MVS job scheduler, JobTrac, and its MVS data archiving and retrieving product, SAR PC.

"We are letting users pull more of their systems and net management information to workstations where they can easily work with it," Carrai said.

Additionally, Legent announced a TCP/IP version of its venerable XCOM file-transfer program. In its first release, XCOM for TCP/IP will reside on any vendor's Unix box and act as a gateway between SNA and TCP/IP nets. Nodes on the SNA and TCP/IP nets that need to transfer files must be running the base XCOM file-transfer product.

A future release of XCOM for TCP/IP will run natively on the TCP/IP and SNA nodes, eliminating the need for the gateway.

Legent is trying to improve the flexibility of its products by bringing them into the PC environment and giving users the option to consolidate network and systems management platforms.

"Legent is putting together a comprehensive set of tools for users to manage diverse heterogeneous environments," said Kevin O'Neill, vice president of the Business Research Group consultancy in Newton, Mass. "It is trying to give users a centralized way to manage the distributed nets they are building now."

Paramount is available for $4,000 to $12,000, depending on configuration. N-Vision for Windows is available for $600. SAR PC for Windows is available for $6,750 per each 50-user increment, and JobTrac is available as a free upgrade to users with existing JobTrac software. The TCP/IP for XCOM file-transfer product has not been priced.

Legent: (703) 734-9494.

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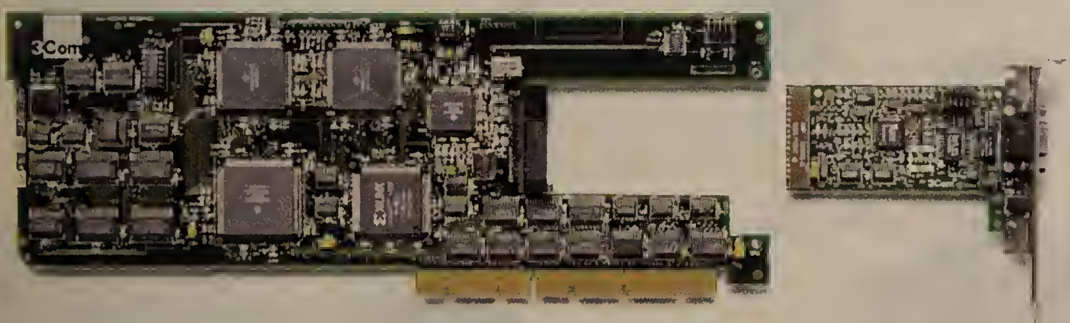
DI revolution.



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LAN WORLD

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Worth Noting

"The biggest thing [RAID] vendors have to compete with are new server-based storage devices — PC-type servers with the same storage as traditional RAID devices, loaded with RAID cards."

Seth Traub
Analyst
International Data Corp.
Framingham, Mass.

Netnotes

AST Research, Inc. and **Advanced Logic Research, Inc. (ALR)** last week announced servers based on Intel Corp.'s Pentium microprocessor.

AST announced the Premium SE P/60, a new model in the i486 Premium SE line. It offers the 64-bit, 60-MHz Pentium processor, up to 128M bytes of memory and 256K bytes of second-level cache. It costs from $7,500 to $9,500.

AST's new Manhattan SMP has as many as four Pentium processors, up to 448M bytes of memory, two Industry Standard Architecture (ISA) and eight Extended ISA (EISA) expansion slots, and up to 16G bytes of internal storage. It costs from $32,000 to $36,000.

ALR unveiled the Pentium-based Evolution V-Q file server. Starting at $5,000, it supports up to 1G bytes of main memory and features a total of 13 drive bays and EISA slots.

ALR also unveiled a Pentium processor upgrade for its ProvEISA file server that reportedly improves performance 57% over similarly configured 486DX2/66 systems. The starting price for the upgrade module is $2,395.

AST: (800) 225-2030; ALR: (714) 581-9240. ◻

Bank beats economic woes with distributed database

Provides framework for strategic business apps.

By Eric Smalley
Special to Network World

While some network managers wait for vendors to deliver all the tools they need to implement a true distributed database management system, others have been using whatever is available to accomplish as much of the task as they can today.

Richmond Savings of Richmond, B.C., for instance, tossed out its mainframe-based centralized database environment in 1987 in favor of a distributed database environment supported by an internetwork of microcomputers.

The distributed database environment, which supports on-line transaction processing (OLTP), provided the foundation for strategic business applications that helped the credit union out of financial doldrums.

With the distributed database environment, tellers at the credit union's 10 branches can update two databases with a single transaction. This approach enables Richmond Savings branches to maintain a copy of each local transaction while logging transactions into a centralized database.

Richmond Savings has 50,000 customers and offers a range of banking services similar to those of a community bank in the U.S. — savings, term deposits, loans, mortgages and foreign exchange, according to Allen Lacroix, vice president of technology at the bank.

Today, Richmond Savings handles an average of 90,000 transactions a day across interconnected Novell, Inc. NetWare local-area networks.

The bank has a total of 350 Intel Corp. 80386-based personal computers running DOS across its 10 branches. Personal computers in each branch are connected to an Intel 80486-based server with 200M to 500M bytes of storage. Each branch connects to a central site using Novell routers and 56K bit/sec links.

At the central site are four 80486-based servers, though only one, with 2G bytes of storage, handles OLTP, Lacroix said. One of the other servers handles software quality assurance and testing, while another serves as a standby for the OLTP server. The last server augments the OLTP server by generating reports such as monthly account statements.

With the current system, Richmond Savings not only handles transactions initiated in the branch offices, but also transactions from automated teller machines, point-of-sale devices in retail stores and over-the-telephone account queries, Lacroix said. The central server handles

(continued on page L6)

Legacy to deliver storage subsystem for enterprise

By Caryn Gillooly
Senior Editor

NEW YORK — Legacy Systems, Inc. is expected to bring out at PC Expo here next month a low-cost disk array subsystem designed to ease storage woes for large companies with remote offices.

The new product, dubbed the Legacy HFD SmartArray, is a hardware/software combination that lets administrators configure as many as nine hard disks as a Redundant Array of Inexpensive Disks (RAID) Level 0, 1 or 5 subsystem. It provides a total of 12.6G bytes of storage.

The Legacy HFD SmartArray combines many features of competing disk array subsystems into one offering.

For example, the system's disks and power supply are hot-swappable, so they can be changed while the system is up and running. The SmartArray also provides an on-line spare disk, which the net administrator can set to take over automatically if another disk fails.

The SmartArray can also help improve performance of RAID 5 implementations. Because RAID 5 is the most fault-tolerant RAID

(continued on page L10)

NetWare 3.11 meets NetWare 4.0

	NetWare 3.11	NetWare 4.0	Percentage increase
Maximum user connections per server	250	1,000	300%
Maximum server connections per user	8	54,000	675,000%
Minimum RAM required	4M byte	6M byte (1)	50%
Minimum disk space required	9M byte	12M byte (2)	33%
Memory protection	No	Yes (3)	NA
File server-specific API calls	332	>500	>51%

(1) 8M byte is recommended.
(2) 60M byte if all components are loaded.
(3) Memory protection is optional.

GRAPHIC BY SUSAN J. CHAMPENY

Move to NetWare 4.0 means risk, change

Users need to shed security of past LAN mgmt. approaches to grow and gain with new system.

"To grow, a lobster must shed its old shell numerous times. Each shedding renders the creature totally defenseless until the new shell forms. . . When risk becomes frightening, think of the lobster; vulnerability is often the price of growth."

— Richard Armstrong

By Mark Gibbs
Special to Network World

Tempted to run out and install Novell, Inc.'s NetWare 4.0 to solve your NetWare 3.X and 2.X management headaches?

Don't be too hasty. The strategic recommendation is not to rush into NetWare 4.0 unless there is a pressing reason. Like the lobster, growing with this new local-area network operating system will involve shedding what we are comfortable with and replacing it with something new.

What follows is an examination of the steps involved in migrating to NetWare 4.0 and advice

(continued on page L7)

Banyan, Novell square off on directory service front

By Caryn Gillooly
Senior Editor

Seeing Novell, Inc.'s NetWare 4.0 as a threat to its dominance in the high-end local-area network market, Banyan Systems, Inc. has fired the first salvo in what is likely to be a protracted battle over which vendor offers better directory services.

At a recent developers' conference, Banyan proclaimed that its StreetTalk III directory service is easier to use and more efficient than Novell's new NetWare Directory Services (NDS).

Until now, Banyan has been the only LAN vendor to provide a comprehensive global naming service. StreetTalk is one of the primary reasons that Banyan's VINES has been used in some of the industry's largest LANs.

With the release of NetWare 4.0 and NDS, Novell is stepping directly into Banyan's territory. NDS provides an enterprisewide naming scheme that rivals StreetTalk's, making the two products direct competitors.

Despite the similar functions of their naming schemes, the companies use different architectures to deliver their services. And although neither vendor's methodology is clearly superior, understanding the differences will make choosing between the two easier.

How high hierarchy

The first and perhaps most obvious difference between the two products is the naming structure used. StreetTalk uses a simple, three-level method for naming, regardless of the enterprise's size. In other words, no user's name will have a string of more

(continued on page L13)

Life after IBM: Parallan exec details firm's goals

Says relationship working out well despite criticism.

It has been almost a year since Parallan Computer, Inc. and IBM struck a deal under which IBM took over the sales and marketing of Parallan's products, making Parallan essentially an IBM development company. As a firstfruit of the relationship, IBM last June released Parallan's high-end multiprocessor Server 290 as the IBM Server 295. This past April, IBM released the Parallan-developed Server 195, basically a scaled-down version of the 295.

Ever since the acquisition, however, competitors have criticized Parallan for not being as prominent at customer sites and for not being as involved in requests for proposal as it had been before marketing and sales efforts were assumed by IBM.

Senior Editor Caryn Gillooly recently spoke with Davis Fields, vice president of marketing at Parallan, to discuss the status of the Parallan-IBM relationship and future product directions.

Since IBM has taken over all sales and marketing of Parallan's products, has there been any confusion in the market as to whose products are whose?

I made a point of keeping a somewhat lower profile for a while after we announced our product last summer because I was concerned that people would become confused as to whose products they really were.

I get some signals sometimes that [IBM's] not communicating as clearly as I think they should. Overall, though, we're extremely pleased.

Our intention as well as IBM's when we started was for them to be able to capture the output of what we did without changing the way we did it. We think it's working very well.

Some of Parallan's competitors have said they're not running into Parallan as much as they used to when they're trying to sell to a customer. What does that say about the marketing job IBM's been doing compared to how Parallan did on its own?

First, IBM is not as focused on this set of products as Parallan was. They've got a huge business with a lot of other products.

Second, we have believed from the beginning that it takes a longer time to get a machine like [the 295] moving. We definitely have spent a lot of energy over the latter half of last year conducting, for instance, class after class for training marketing reps and systems engineers as well as support center people.

ILLUSTRATION ©1993 JOEL NAKAMURA

We've had classes at Parallan, we've had classes at IBM sites, we've trained in Boca Raton, [Fla., and] we've trained trainers so they can go and train more people. We've trained manufacturing people and worked with the handoff of manufacturing. So there's lots of work to do to get enough people ready to move to get this thing going.

What would you do differently from what IBM is doing?

I could always argue [for] more energy, more promotion, more salespeople and more training. I'm biased, obviously, but I'd like to put as many of IBM's forces as possible behind this product.

Are there plans to beef up the Parallan presence? Perhaps people associate the Parallan name with superservers but don't see the Parallan name much any more — are there plans to make it more obvious that these are Parallan products?

The bottom line is, when it's all over with, whether Parallan is visible or whether our competitors think they see us is not on my top 10 list of things to worry about. I need my product to be successful. I made a decision when we engaged in this thing that we were not going to pursue a separate product strategy of our own that is independent from IBM's. I wasn't going to go out and sell products against IBM.

We studied a lot of ways we could have done this and concluded that the reason a lot of relationships in high tech in the past have not worked is that the agendas of the partners didn't line up. The only way to make this as successful as we wanted it to be was for our agendas to line up exactly. For example, we ought to have one plan [that covers] who the customer goes to and how the customer purchases the products, how the customer attains support and so forth. We have continued and are going to continue to do everything we can behind the scenes to make it successful.

We did this because people liked our technology and our direction, but when we started talking to them about big, big projects and multiyear commitments, they insisted on doing business with someone that could provide the training, the integration services and 24-hour, on-site support worldwide. Basically, once they understood what we were all about, they held us to a standard that only people like DEC, IBM and Hewlett-Packard could ever meet.

For those customers that were hesitant about buying

(continued on page L14)

ATM price barriers falling, but other issues pending

By Skip MacAskill
Senior Writer

As far as ATM is concerned, history will not repeat itself.

Striving to avoid the mistakes made with previous technologies that have been draped with the industry panacea mantle, Asynchronous Transfer Mode vendors are hoping to make the technology attractive to users by concentrating on aggressive pricing, standards and interoperability — issues that plagued vendors pushing ATM predecessors such as FDDI, OSI and ISDN.

While much work remains in the area of standards and interoperability, ATM vendors have made strides in addressing one major concern — price.

Last spring, two of the most influential players — Fore Systems, Inc. and SynOptics Communications, Inc. — rolled out ATM switches that offered aggressive per-port prices of $2,495 and $1,495, respectively. Those moves basically halved the more than $4,500 per-port price of a typical ATM switch at that time.

Fore also slashed adapter card prices to less than $2,000, while SynOptics announced pricing of less than $1,300 for the cards, easily undercutting the $4,000-to-$5,000 price range that similar products were fetching.

That trend continued this month when Network Equipment Technologies, Inc.'s (NET) Adaptive Division slashed prices by up to 40% on its ATMX Switch and ATMX Adapter Card.

Pricing for the switch, which includes all required call setup, operating and net management software, is $2,700 per port. The adapter card, which is used in Sun Microsystems, Inc. SPARCstations, now costs $2,500 (see graphic, this page).

Last week, Fore announced a second round of reductions, including a 40% price drop for its existing 16-port ForeRunner Switch, which is now priced at $2,995 per port. Its non-Sbus adapter cards were reduced by $1,000 each, as well.

While SynOptics may appear to be the price leader, the $1,495 per-port tag of its LattisCell ATM Switch does not include the cost of call setup and network management software as the Fore and NET products do. This explains a good portion of the price gap between the various products.

A fourth major player, Newbridge Networks, Inc., offers a 12-port ATM switch/hub for $500 per port, while its eight-port Vivid ATM local-area network switch is tagged at $5,000 per port. Its adapter cards range in price from $1,500 to $2,500, but the company expects those prices to fall to approximately $500 per card within the next 12 to 18 months.

"The pricing direction is right on our game plan," said Jeff Marshall, managing director of communications at Bear, Stearns & Company, Inc., a New York brokerage firm that is seriously evaluating ATM. "These pricing levels will open up ATM to a broader market, and you're going to have some more ubiquitous rollout schedules as a result of the precipitous price reductions."

While these price reductions are essential in gaining ATM credibility among users, it only represents the beginning of a long road, vendors and analysts said.

Citing a recent study from McQuillan Consulting that shows that users' top ATM concern is pricing, followed by standards and broad industry support, Rob Newman, group product-line manager for ATM at SynOptics, acknowledged that ATM still needs a lot of work.

"Whether you remove the price barriers, standards issue or broad support problem first, all three eventually have to be removed," he said. "We've gone a long way toward removing the first, so now we can focus on the next two."

Pricing might be the hook that grabs users' attention, according to George Marshall, director of marketing for NET's Adaptive Division. "It's only been a relatively modest amount of time since some of these price changes went into effect, but it will fuel greater interest from the commercial users," he said.

Tom Nolle, president of CIMI

(continued on page L16)

ATM pricing

Vendor	Switch (per port)	Adapters
Fore Systems, Inc.	16-port – $2,995 64-port – $2,495	$1,995 to $3,495
Newbridge Networks, Inc.	8-port – $5,000	$1,500 to $2,500
Network Equipment Technologies, Inc.	90-port – $2,700	$2,500
SynOptics Communications, Inc.	16-port – $1,495*	Under $1,300

*Price does not include the cost of software needed for call setup and management.

GRAPHIC BY SUSAN J. CHAMPENY

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Micro-Hub LE

Distributed workgroup hubs presented cabling problems in a 10BaseT environment until now.

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The Micro-Hub LE is the perfect solution for your non intelligent hub requirements. It has twelve diagnostic LEDs giving per port and global status on network conditions. And its attractive packaging features a rugged aluminum enclosure. MiLAN's Micro-Hub LE also comes standard with an unparalleled five year warranty.

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Circle Reader Service #2

Access hubs breathe new life into 3270 terminals

Offer flexible way to access mainframes, Unix.

VENDOR VIEW

By Robert Gordon
Special to Network World

The move to "rightsized" computing architectures based on local-area networks and Unix has largely ignored the practical problems of what to do with the millions of dollars of installed 3270 terminal-to-host technology.

How can companies cost-effectively migrate their large investments in IBM systems and technology to Unix network environments?

"A growing number of innovative companies are developing solutions that enable users to integrate proprietary SNA environments with TCP/IP and IPX environments," said Val Sribar, senior research analyst at the META Group, an industry consulting firm located in Reston, Va.

"These solutions provide companies with the ability to gradually evolve to a rightsizing environment, effectively deferring a portion of their infrastructure changeover costs."

Three classes of solutions have surfaced that accommodate corporate investments in 3270 technology: modified cluster controllers, centralized solutions such as mainframe or front-end processor (FEP) software that provides 3270-to-Unix interconnectivity and a new class of products called 3270 access hubs.

Each of these technologies incorporates a different approach to user interoperability.

Modified cluster controllers

A number of cluster controller vendors, including IBM and Memorex Telex Corp., have provided products that allow users to migrate their 3270 terminal base to Unix and preserve their cluster controller equipment, as well.

However, these technologies are typically limited in their support of protocols and LAN topologies. Some vendors' products offer limited support for Transmission Control Protocol/Internet Protocol, but many lack critical functionality including TN3270, support for printing from Unix hosts to coaxial cable-attached printers or more than a single LAN connection/topology.

As important as the lack of functionality are the limitations placed on these systems due to the nature of the older underlying cluster controller architecture. These limitations can result in unacceptable performance, depending upon the network and user requirements.

In addition, many of the standard capabilities provided and expected in modern-day internetworking equipment are not available, including scalability to large-capacity, sophisticated network management support, hot-swappable modules and dual power supply options. As a result, these products may be more appropriate in small remote-site implementations, where their limited capacity and functionality would not pose a problem.

Centralized solutions

Mainframe- and FEP-based software represents the second

(continued on page L16)

DEC intros E-net bridge to link metro LANs via CATV

By Jim Duffy
Senior Editor

MAYNARD, Mass. — Digital Equipment Corp. has unveiled an Ethernet bridge that allows users to link LANs over a metropolitan area using cable television facilities.

The bridge, called ChannelWorks, provides 10M bit/sec of throughput over standard 6-MHz cable channels and supports as many as 83 channels. It is designed to extend Ethernet local-area networks throughout city limits, effectively creating a metropolitan-area network spanning a maximum of 70 miles.

ChannelWorks, designed and manufactured by LANcity Corp. in Andover, Mass., is being resold by DEC under a private-label agreement.

The protocol-independent bridge is similar in size to a CATV converter. It has one Ethernet port that supports 10Base5, 10Base2 or 10Base-T media and one port for attaching to the CATV network.

It is manageable via a Simple Network Management Protocol console and supports the Span-

(continued on page L8)

PCMCIA card, bridge fill out NCR wireless LAN line

By Fredric Paul
Senior Editor

NIEUWEGEIN, The Netherlands — NCR Corp. last week filled out its WaveLAN line of wireless LAN equipment with a new wireless network interface card (NIC) based on the Personal Computer Memory Card International Association (PCMCIA) standard and a bridge designed to link wireless and wired networks.

"The product line is complete," said Cees Links, director of product marketing for NCR system engineering. The new WavePoint bridge and WaveLAN/PCMCIA card for notebook computers join NCR's WaveLAN wireless local-area network adapter cards for desktop personal computers with Industry Standard Architecture or Micro Channel Architecture buses.

A WavePoint bridge in the right location can enable a single network to cover a whole building, Links said, while notebook users equipped with WaveLAN/PCMCIA can connect to the network regardless of where they are in the building. Users can now build facilitywide wireless nets.

WavePoint functions as the access point for the wireless LAN to connect to the wired backbone network, Links said. As a bridge, it is independent of the network operating system and network applications, simply passing the information from one network to the other.

In addition, WavePoint supports the Simple Network Management Protocol.

Replacing a bulky PC equipped with a WaveLAN card, WavePoint is compact and relatively flat, making it easy to install in a variety of table, ceiling and wall locations. Without all the components of a PC, such as keyboards and monitors, WavePoint makes a more reliable and economical bridge to wired LANs.

An Ethernet version of WavePoint will ship in June or July for $1,995. A StarLAN 1 version will be delivered in the same time frame for $1,895. A token-ring version will be available later this year, although no price has been set for it, Links said.

WaveLAN/PCMCIA consists of a PCMCIA Type II integrated circuit card holding the electronics.

Built to the PCMCIA standard, the credit card-sized NIC fits inside properly equipped portable computers and connects to a cassette-sized external assembly holding switching technology and a pair of antennas. The antenna portion includes a self-adhesive mounting bracket.

Although the technology is generic enough to eventually be used in any PCMCIA-compliant device, Links said, the initial release will be configured for the NCR 3170 notebook. With significant OEM discounts, the WaveLAN/PCMCIA is likely to show up in custom configurations designed for retail, transportation, medical and other vertical markets, he said.

The PCMCIA version shares all of the technology used in the full-sized WaveLAN NICs, including spread-spectrum radio technology and a carrier-sense multiple access with collision detection protocol optimized for wireless use. Saturation is at 180K bit/sec, compared to about 250K bit/sec for standard Ethernet.

"Ethernet users won't notice the difference [in performance]," Links said.

WaveLAN nets can support as many as 200 users of standard business applications such as electronic mail, up to 70 users of medium-use applications such as database queries and 20 to 25 users of heavy-use applications such as computer-aided design and manufacturing, Links said.

NCR plans to ship WaveLAN/PCMCIA in September. It will cost $695, the same price as the desktop version.

NCR: (800) 225-5627. ◻

Comdex to showcase wide range of networking wares

By Fredric Paul
Senior Editor

ATLANTA — Apart from the long-awaited announcement of Microsoft Corp.'s Windows NT, this year's Comdex/Spring and Windows World '93 shows here will showcase a range of other new products, from wireless LAN equipment to network management tools and FDDI adapters.

Comdex introductions include AeroComm, Inc.'s GoPrint and AeroNet wireless local-area network products, Automated Design Systems, Inc.'s (ADS) Net Tools Help+, CNet Technology, Inc.'s Hub Management Interface (HMI) and Fiber Distributed Data Interface products as well as networking products from CNet's MaCNet subsidiary, and Spectrix Corp.'s SpectrixLite mobile LAN.

AeroComm, based in Lenexa, Kan., will announce two spread-spectrum wireless LAN products that operate in the high-performance 2.4-GHz band.

AeroNet will let users of multiple LAN environments work together without worrying about different wiring conventions. It supports LANs such as Novell, Inc.'s NetWare and NetWare Lite, Microsoft's LAN Manager and Windows for Workgroups, Artisoft, Inc.'s LANtastic and Apple Computer, Inc.'s AppleTalk.

AeroNet is scheduled for delivery in the third quarter for less than $400 per node. GoPrint is a wireless printer sharing and network printing system that will begin shipping this month for less than $250.

SpectrixLite is a product designed to provide LAN connectivity to workers who move around within a room or building. Infrared antennas connected to controlling personal computers create room-sized "cells."

Coupled with Spectrix's PC bridging technology, SpectrixLite enables users of hand-held computers to stay in constant contact with a backbone-wired net, even as they move from room to room.

The Evanston, Ill., company said its product also tracks the location of mobile devices and provides network statistics and diagnostics. Pricing and shipping dates have not been announced.

ADS, based here, will announce Net Tools Help+, a Windows-based utility designed to help LAN administrators assist users more quickly by attaching configuration data including DOS, Windows and network information to user-generated trouble tickets. When end users experience problems, they simply click on the Net Tools Help+ tool bar to send a trouble ticket to the network administrator.

Users describe their problem and specify its urgency, while the utility automatically adds relevant information, including memory maps, Windows mode and configuration data, loaded network Dynamic Link Libraries and security data.

Version 1.0 of Net Tools Help+ works under NetWare and sends the trouble ticket directly to the ADS console.

Future versions will run under LAN Manager, Banyan Systems, Inc. VINES, Windows for Workgroups and LANtastic, and will route trouble tickets via a number of electronic mail systems. Available in June, Net Tools Help+ costs $195 per user, regardless of the number of attached nodes.

CNet will debut a host of con-

(continued on page L10)

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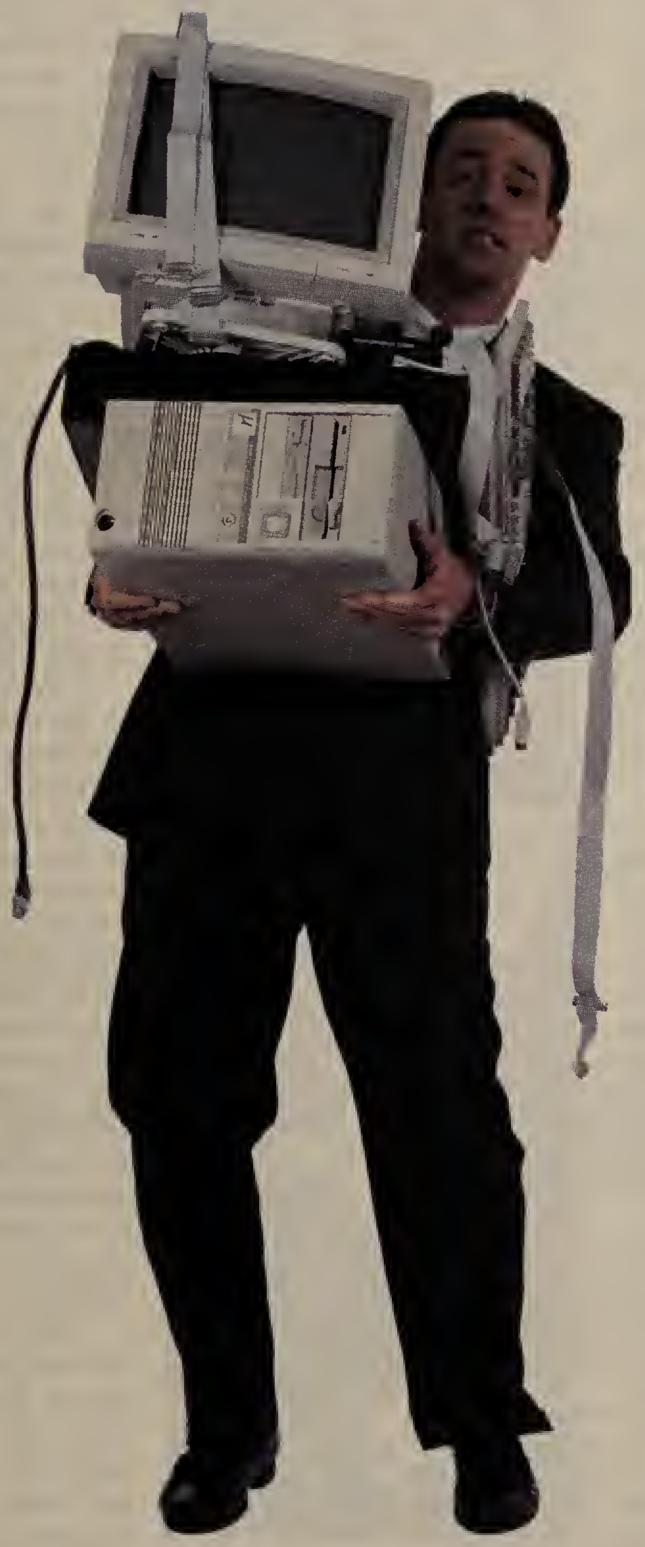

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Bank beats economic woes

continued from page L1

three to four transactions per second.

The credit union's distributed OLTP application was written using an early version of a software development language provided by ProLogic Computer Corp. That development language, now called Probe, came with an integrated relational database management system and an end-user interface.

Charting the data flow

The OLTP application's typical processing flow begins when a transaction such as a savings account withdrawal is entered on a teller workstation. The transaction is recorded at the local server, which begins an initial set of checks, such as making sure there is enough money in the account. The transaction is then forwarded to the central server, which processes a final set of checks, such as determining whether the customer's credit rating has changed.

Finally, the central and local servers use a two-phase commit protocol to make sure the transaction is recorded on both servers, thus eliminating the chance that one database will record a transaction while the other does not.

With two-phase commit, the servers let each other know when they are about to record a transaction. Once the transaction is recorded, the servers exchange another message detailing whether the transaction was recorded correctly. If the transaction is recorded correctly, a message verifying the completed transaction is sent to the teller's workstation. If neither server can record the transaction for any reason, the transaction fails and a notice of the failure is sent to the teller's workstation.

The teller can attempt the transaction again, or the application can use a mechanism that ensures that transactions cancelled during the two-phase commit process are processed when all of the servers are running, Lacroix said.

In addition to allowing data to be checked locally, storing transactions in each branch enables tellers to balance their ledgers at the end of the day during a cash reconciliation process without tying up the central server, Lacroix said. If a centralized database were used, tellers in all 10 branches would have to tap into transaction records on the central server, which would buckle under the processing load.

With the distributed approach, the centralized data is used overnight to generate reports for management and to feed the account statement process.

Richmond Savings also uses a database replication process to download a copy of the centralized database to each branch overnight. This ensures that every branch starts off each day with the most up-to-date data for its customers.

The bank also employs the intelligence of client workstations in its branches, Lacroix said. Many transactions that used to be recorded largely on paper, such as mortgage applications, are now recorded on-screen at client workstations that tap into the distributed database for needed information.

The applications running on the client workstations are context-sensitive, meaning they adapt as users provide information. For example, the field on the first screen used to process a new account asks whether the account is for a business or a person, Lacroix said. If the teller enters "business," the field asking for a social security number is dropped from the next screen.

Allen Lacroix, Richmond Savings

PHOTO ©1993 STERLING WARD

"As you're filling out the screen, [it] reconfigures itself, so you gather only the information that's relevant," Lacroix said.

In the example of a mortgage application, a bank officer interviews the applicant and enters responses into an on-screen form on the workstation. The application is then processed using the local portion of the database.

If the process yields approval, the transaction to fund the mortgage is forwarded to the central server. Also, the repayment process is usually set up on the system in the form of automatic payments or payroll deductions, Lacroix said.

Pulling the trigger

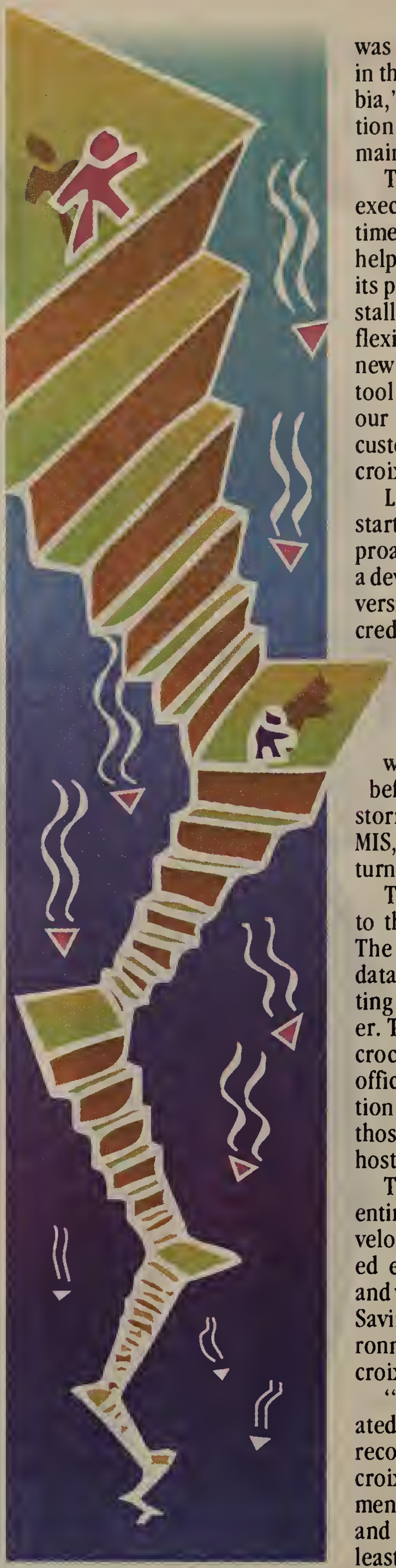
The credit union uses a feature of ProLogic's programming language that allows triggers to be configured on client and server applications, Lacroix said. Triggers are mechanisms by which an event or command initiates a series of procedures.

Triggers have two purposes. One is to ease the transaction processing load and minimize network bandwidth needs by allowing data to be checked before a transaction is forwarded to the central server. Triggers also ease the load by forwarding over the network only simple commands that initiate a series of procedures at the central site, rather than a series of commands to invoke each procedure separately.

Secondly, triggers ensure that all portions of the distributed database are consistent — a concept known as procedural referential integrity. For example, a trigger could be configured to end the automatic payment schedule for a credit card account when the customer closes the checking account from which the payment is drawn.

Triggers are one of many features in the ProLogic-supplied development language that Richmond Savings used to build its applications. That development language is a predecessor of the currently available Probe, a fourth-generation language designed for writing client/server database applications on microcomputers.

Probe is designed to ensure that the client side of an application has the appropriate triggers to interact correctly with the server side of the application, said Rob Murray, communications manager for ProLogic who worked for Richmond Savings when the credit union decided to adopt a distributed database environment.



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For example, if a developer declares a data type and sets attributes for it on the server side, Probe automatically sets the triggers needed by the application to interact with that data type and its attributes on the client side, Murray said.

A little history

The distributed environment is a far cry from what Richmond Savings used in the early and mid-1980s, when its operations were supported by a host computer from Geac Computer Corp., Ltd., which Lacroix described as equivalent to an IBM 4300 mainframe. Many of the bank's transactions were still handled on paper.

"Back in '83 [and] '84, there was a pretty significant downturn in the economy in British Columbia," Lacroix said. "Our institution was having a rough time maintaining a profit."

The credit union's new chief executive officer decided at that time to take an important step in helping the credit union through its problems by approving the installation of a more powerful and flexible computer system. "[The new system was considered] a tool that would let us understand our customers better, to learn customer behavior patterns," Lacroix said.

Late in 1984, ProLogic, a start-up software company, approached Richmond Savings with a development language and conversion plan that would let the credit union move its operations to networked microcomputers.

Richmond Savings made its decision to move to a network of microcomputers long before the PC revolution stormed the hallowed halls of MIS, before the IBM PC had even turned 4 years old.

There were three major steps to the conversion, Lacroix said. The first was extracting all of the data from the mainframe and putting it on a microcomputer server. The second was to deploy microcomputers at the branch offices and run terminal-emulation software that would enable those PCs to access the existing host-based application.

The last step was to rewrite the entire banking application. Development work for the distributed environment began in 1986 and was finished when Richmond Savings cut over to the new environment in October 1987, Lacroix said.

"The environment we've created has allowed us to establish a record profit every year," Lacroix said. "Our ability to implement new [financial] products and make enhancements is at least five times greater."

This gain is largely due to the shortened application development time. One new service made possible by the distributed environment enables the bank to automatically waive customers' checking account fees if they have had sufficient deposit and loan activity when their checking account statements are prepared, Lacroix said.

Moving to a LAN-based distributed database environment was apparently a smart move for Richmond Savings. Since the cutover, the credit union has enjoyed a booming business, jumping from $400 million in assets in 1987 to $1 billion in assets today, Lacroix said.

Smalley is a Boston-based free-lance writer.

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NetWare 4.0 means risk, change

continued from page L1

on how to get there with as little pain and vulnerability as possible.

NetWare 4.0 is a big system and not just big in code size — it needs at least 6M bytes to get running (see graphic, page L1) — but big in scope, thanks mostly to the new NetWare Directory Services (NDS) subsystem.

NDS is a database containing information about everything on the network that permeates nearly every event that occurs under NetWare 4.0.

NDS replaces the NetWare 3.11 information databases, called binderies. Each NetWare 3.11 file server keeps its own private bindery. Although binderies contain information about other servers, little more than the server's name and network address is available.

Therefore, in a NetWare 3.11 internetwork, each server is effectively isolated from the others, meaning management of resources is handled on a server-by-server basis. The opportunities for making mistakes, such as allocating overly liberal rights, are much greater when multiple, isolated systems are being managed.

The only way to gain a systemwide view of a network of NetWare 3.11 servers has been to use products such as Novell's NetWare Naming Service (NNS) or Banyan's Enterprise Network Services (ENS), which integrate the management of bindery data across multiple servers. While they go a long way toward enabling enterprise server management, they are essentially addons that can only do so much.

NDS acts as a global network directory service, a database of information for the entire internetwork. It is used to record information about objects in the internetwork. These objects include servers, printers, users, user access privileges and just about anything else.

NDS arranges these objects in a hierarchical structure that can mimic the structure of an organization. In security terms, having a single, integrated view of all internetwork resources and their access privileges makes management and, therefore, security control easier. And because it operates at a system level, it is far more robust than NNS, which is essentially a bolt-on fix.

The arrival of NDS also moves NetWare from a server-based access model to a network model. In a server-based access system, every user-to-server connection is effectively independent. Each server has to have an account for that user.

Also, each account must be maintained independently of other accounts the user has on other servers. To access resources on a server, the user has to establish a session with that server.

Under NDS, user accounts are defined in the context of the entire internetwork's structure. After successfully logging on to a NetWare 4.0 net, users can access any resource on any server they are permitted to access. This network access model makes it much easier to control the system.

Users effectively have only one identity for the whole net instead of a separate identity for each server. The result is less administrative burden and less opportunity to make mistakes. The down side is an inherently more complex system to use. When a user moves from the NetWare 3.11 environment, the bindery data is translated into the NDS database automatically. Although no major problems have been found, there will be cases where incomplete translations occur due to damaged binderies. Also, some NetWare-aware utilities create their own, nonstandard entries in the bindery, which may cause problems.

Partitions

The NDS architecture divides its database into subsections, called partitions, that are stored on different servers and are transparent to users. Distributing the partitions enables the NDS database to survive the failure of a server or network connection.

A single server holds the master copy of a partition, and replicas of that partition — declared as either read-only or read-write — can be kept on other servers.

Partition replicas allow for two important facilities. The first is improved access time, particularly if the accessed replica is a copy of a master partition that is only available over a wide-area network link. This means the user must consider where to locate the replicas, the probable size of NDS updates and how often to update the replicas.

It is also important to consider where additions and changes to an NDS partition will occur. With read-write partition replicas, any changes that occur in the replica need to be reconciled with the master version. This means that changes go to the master and return to the replica, creating additional traffic.

There is a performance penalty if there are multiple read-write replicas: The reconciliation process becomes more complex, adding another delay to the synchronization process. It is generally better if replicas are read-only.

ILLUSTRATION ©1993 JOEL NAKAMURA

The second function of the replicas is redundancy. If a server suffers a catastrophe, the NDS partitions that were replicated would keep the NDS data on-line and recoverable.

According to Novell, users who do not have a replica and lose a partition will lose all access to that data and to any partition below the lost partition. Restoring from a backup will fix this but could take considerable time in a large internetwork.

Because NDS is systemwide, all changes to the NDS database must be sequenced logically. To ensure this, NetWare 4.0 introduces time servers, which act as master time references to other servers. This feature, which requires planning to be effective, ensures that time is maintained consistently over an entire internetwork. There is even support for getting time data from an atomic clock.

Trees and objects

To anyone familiar with the concepts of X.500, Banyan VINES' StreetTalk or ENS, the organization of NDS won't be alien. The structure, which is like an inverted tree, is intended to have the same conceptual structure as the organization it supports.

Branching out from the base of the tree (called the root) are objects, which are either containers or leaf objects. Containers hold other objects, which can, in turn, be either containers or leaf objects, and are intended to reflect the organization's structural components, such as companies, offices, departments and work groups.

Leaf objects stand for components of the network such as users, servers and printers. For example, the "Consulting" container holds a user-type leaf object named MGibbs.

Objects have properties, and properties have values. For example, a user object would have a logon name property with the value "MGibbs," a last name property with the value "Gibbs" and a telephone number property with the values "Voice: (805) 647-2307, Fax: (805) 647-2945." Note that this property has multiple values. A server object has properties of version, physical location and net address.

The whole purpose of this complex scheme is to provide the means to create a well-structured, comprehensive model of an entire enterprise network.

NDS was designed to describe tens of thousands of users, thousands of resources and hundreds of servers dispersed across various countries. Being able to manage the users and services on international internets is a new and much-needed NetWare facility.

> The opportunities for making mistakes are much greater when multiple systems are being managed.
>
> ▲▲▲

When 3.11 systems were configured, Novell always advised that the disk directories be structured by tasks, rather than laid out to represent the organization. The argument was that control of access could be managed through the allocation of user and group rights.

But with each server being isolated, the problems of coordinating and planning an internetwork of tens or hundreds of servers was extremely complex.

With NetWare 4.0, NDS provides a single structure that encompasses all servers and resources.

Establishing a management strategy for controlling access can now be done for the entire internet. This requires systems managers and designers to develop a much clearer picture of how their organization functions and how this can best be reflected in NDS.

Shedding the old shell

Recognizing the enormity of the task of upgrading current NetWare environments to this NDS nirvana, Novell has supplied some useful tools.

You can now install NetWare from compact disk read-only memory disks and floppy disks on the target server or "across-the-wire" from a workstation.

Novell is so eager to help users that it even included support for migrating from 2.X to 3.11 and then from 3.11 to 4.0. The installation and upgrade processes are not difficult, but they do require care.

Before upgrading, users will need to get updates of all third-party NetWare Loadable Modules (NLM) they are using.

The bad news is that most existing 3.11 NLMs will be incompatible with NetWare 4.0. The good news is that most NLM vendors are reengineering their products very quickly.

Novell has replaced its Help system with ElectroText. While installing ElectroText takes 30M bytes of disk space, the entire NetWare manual set comes with a much better interface, making it worth the cost.

Cooking the lobster

The following provides a general guide to dealing with the process of migrating to NetWare 4.0:

■ **1. Develop understanding.** To deal with NetWare 4.0, you are going to have to invest in education and experimentation.

■ **2. Use an incremental approach.** To avoid problems in multiserver environments, migration to NetWare 4.0 should be carried out incrementally.

The relationship of the organization to the network and how this will be represented in NDS needs to be carefully thought out. Standards for internetwork performance also need to be established at this point.

■ **3. Make backups.** Novell recommends taking at least two independent, full backups of a serv-

(continued on page L8)

Move to NetWare 4.0 means risk, change

continued from page L7

er that will be upgraded. This is no time to be brave or have faith.

■ **4. Take your time.** Whether you use Novell's across-the-wire migration method or the in-place method, don't try to rush it. The NetWare 4.0 installation is more complex than 3.11, so you will need more time.

■ **5. Verify.** There is no reason to expect that the migration process will fail. By the same token, there is no reason to expect that it will work. Remember the auditor's rule: "Trust but verify."

■ **6. Back up and test.** Extensive testing and integrity checks are highly recommended after a backup. Once the system is running, restoring the 3.11 version to recover lost or damaged files may be difficult. The bigger the server system disk space, the more difficult it will be.

■ **7. Monitor.** NetWare 4.0 is new. Its scope is much greater than 3.11, and its impact on how the network is managed and controlled will be profound. The performance targets set in Step 2 need to be checked regularly to ensure that performance and service are correct.

■ **8. Train the users.** Unless your system does a very thorough job of insulating the user from the system, training will be required. NetWare 4.0 is very different at the workstation command-line level, and the uninitiated user will be lost.

While migrating to 4.0, you will be just as exposed as the lobster shedding its shell. Only education, research and planning will get you a new shell.

And when you get that shell, you will have grown your network and gained an invaluable set of management and control features. Then it will be back to swimming with the sharks. ◘

Gibbs is a writer, consultant and technology analyst with the National Computer Security Association. He can be contacted at (800) 488-4595, through CompuServe at 75600,1002 or Novell's nHub at mgibbs@gyre. His latest book, "The Absolute Beginner's Guide to Networking" (SAMS/Prentice Hall), is now available.

DEC intros bridge to link LANs via CATV

continued from page L4

ning Tree Protocol, which prevents Ethernet packets from continuously traversing a network of interconnected bridges.

Better alternative

The product is aimed at users that need a communitywide infrastructure to support distance learning, telemedicine, videoconferencing, geographic information systems and multimedia applications, DEC said. CATV networks can offer a less expensive and higher throughput infrastructure than the telephone companies can, analysts said.

"There are lots of organizations that are geographically distributed but can't afford the very large costs of wide-area network facilities," said Peter Kastner, vice president of Aberdeen Group, Inc. in Boston. "They may need or want to move large amounts of data around, but they just can't afford to go to the phone company for a very complex network."

> DEC could realize $100 million in revenue from sales of ChannelWorks during the next two or three years, estimated Peter Kastner, vice president of Aberdeen Group.
>
> ▲▲▲

Dataquest, Inc. estimated that alternative network access through CATV companies will be a $1 billion market by 1997.

Kastner said CATV companies can offer 10M bit/sec Ethernet for less than a telephone company can offer 1.5M bit/sec T-1 service, and some cable companies currently offer Ethernet services over their networks. He estimated that DEC could realize $100 million in revenue from sales of ChannelWorks during the next two or three years.

DEC is currently negotiating deals with cable companies such as Time Warner, Inc. and Tele-Communications, Inc. to establish communitywide Ethernet networks, said Lynn Jones, business manager for DEC's CATV group.

ChannelWorks costs $4,995 and will be available in the third quarter.

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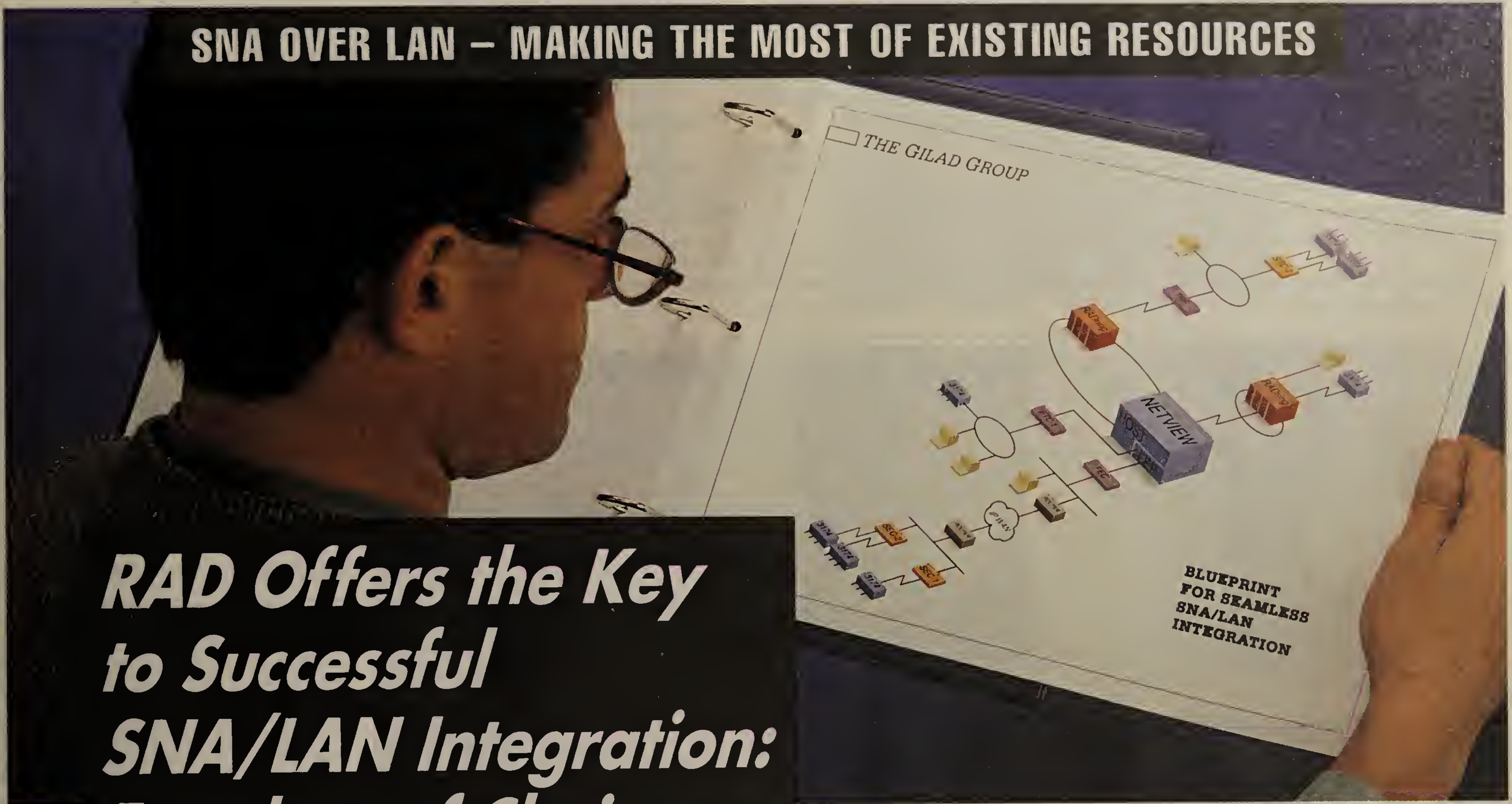
Circle Reader Service #9

SNA OVER LAN – MAKING THE MOST OF EXISTING RESOURCES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Circle Reader Service #5

Legacy to deliver storage subsystem

continued from page L1

level, it also degrades performance the most, particularly when a user issues a command to write to a disk. To combat this, Legacy has added a feature that will "save up" write requests to the disk and do several writes at once, as opposed to accessing and writing to the disk each time a write is requested.

Legacy executives say the primary focus of the product is not performance, but the capabilities that are essential to administrators with large enterprise networks that have many remote locations.

"Most products out there are focused on capacity and performance," said Mitch Vine, director of marketing for Legacy, based in Markham, Ont. "We're focused on remote management and the costs associated with managing remote sites."

For example, SmartArray will send an audible alarm or visual message to a remote administrator's workstation or beeper if a disk, power supply or fan fails on the system. It also has temperature sensors and will signal the net manager if there is a fluctuation in the temperature of the system, perhaps forewarning an eminent failure.

Failure messaging

For Novell, Inc. NetWare administrators, NetWare-specific software will automatically send a message to a user or users other than the administrator if there is a disk or other system failure. This ensures that someone is aware there has been a failure even if the administrator is out of the office.

Although the individual features offered in SmartArray are not new, Legacy has an edge in providing them all in one offering, analysts said.

"Everybody already has some of these features out there, but few have incorporated them all into one product," said Seth Traub, an analyst at International Data Corp., a research and consulting firm based in Framingham, Mass.

More to come

Traub added that net managers need remote management capabilities and Legacy is one of only a handful of companies that will be delivering these capabilities soon.

The SmartArray is expected to go into beta test by the end of next month and will ship by Aug. 1. Although pricing will vary depending on the configuration, a 2G-byte SmartArray will cost $9,999.

Legacy: (508) 435-4700.

Comdex to showcase networking wares

continued from page L4

nectivity products, including its new low-cost CN6010HMI Hub Adapter and CN6000HMI Expansion Hub Card.

Integrated directly into a NetWare file server, the hub management cards are designed to take advantage of Novell's HMI to increase network management flexibility and control. The CN6010HMI lists for $679, while the CN6000HMI costs $599. Both products will ship in June.

CNet, based in San Jose, Calif., is also announcing the first in its new line of high-performance FDDI-based network interface cards (NIC). The new NICs use direct busmastering technology and the DP83200 "scatter-gather" direct memory access capability to provide transmission speeds of up to 100M bit/sec. Available in June, the CN900FDF will cost $1,499, while the CN900FDS will cost $899.

On the Macintosh side, CNet subsidiary MaCNet will introduce for immediate availability three new Ethernet cards, a pair of network concentrators and a PowerBook network adapter.

Priced at $299, the SCSI490 Ethernet adapter attaches to a Macintosh Small Computer System Interface (SCSI) port and supports both BNC and RJ-45 connections. It is register-compatible with EtherTalk and supports AppleTalk Phase 1 and 2. The $329 SCSI490PB, meanwhile, is a similar product designed for Macintosh PowerBook notebook computers.

MaCNet's NU460 and SE470 enhanced Ethernet cards support AppleShare, NetWare for Macintosh, System 7 and AppleTalk. The NU460 is designed for Macintoshes equipped with NuBus slots, while the SE470 works with Macintosh IIsi and SE/30 machines. Both units cost $199, have 64K bytes of random-access memory and support a 10M bit/sec transfer rate.

The MaCNet 8-Con-8800 and 12-CON-8000 10Base-T work group hubs feature cascade ports for parallel expansion and diagnostic LEDs. The eight-port 8-CON-8800 costs $395, while the 12-port 12-CON-8000 costs $795.

AeroComm: (913) 492-2320; ADS: (404) 394-2552; CNet: (408) 954-8000 or (800) 486-2638; MaCNet: (408) 954-8888; and Spectrix: (708) 491-4534.

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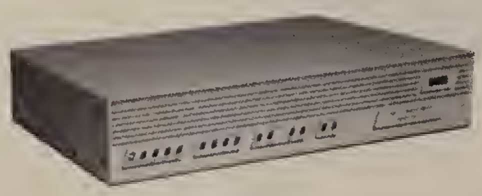

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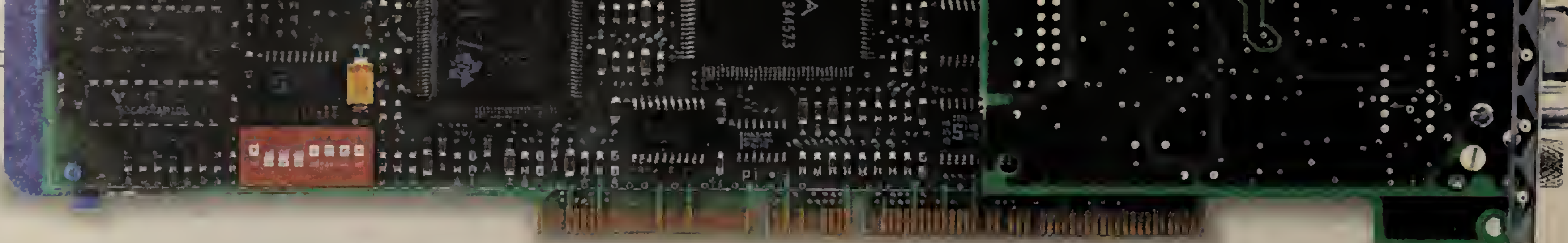

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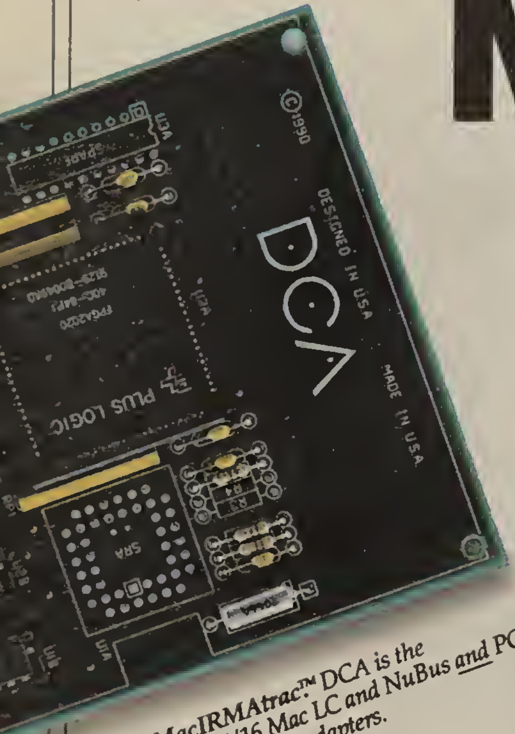

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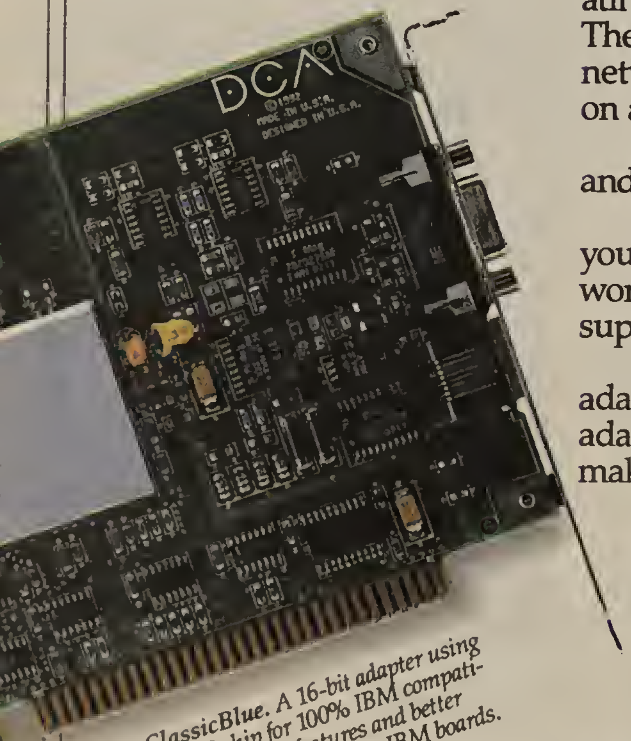

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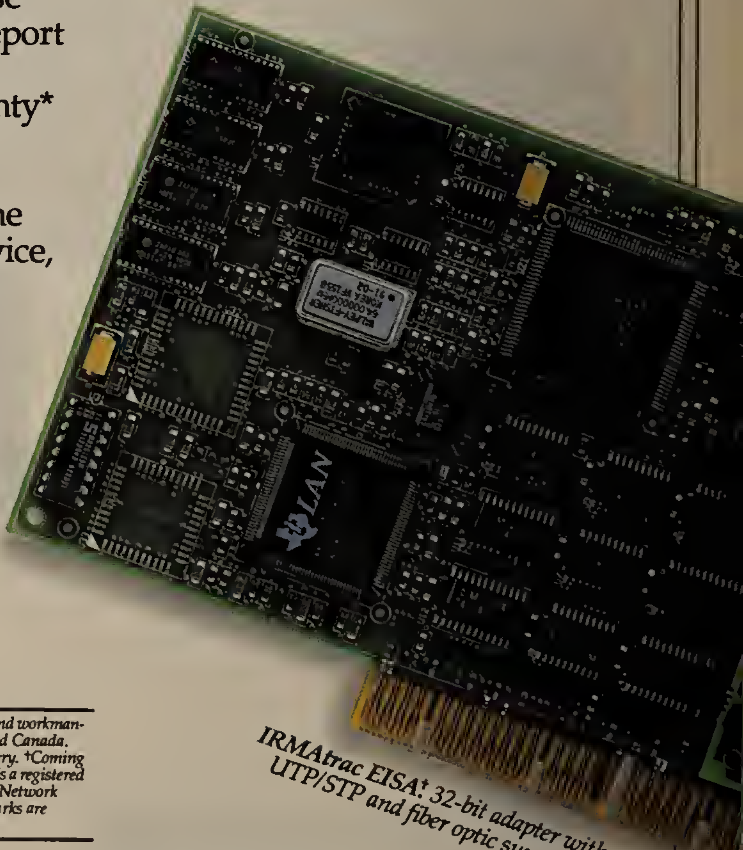

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MACINTOSH

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Circle Reader Service #12

Banyan, Novell square off on service

continued from page L1

than three attributes — for example, name.department.company.

"The more levels that are part of the name, the more complex it is to use," said Mike Wixon, manager of technical services at Banyan, based in Westborough, Mass. "Things about me shouldn't be part of my name. The question is, if you have six parts to a name, has that made it easier for you?"

In the other camp, Novell's NDS uses an unlimited hierarchical scheme. Depending on how the system is set up, a user can have a name with a string as small as two attributes, such as name.department, or a string with several attributes, such as name.group.department.company.state.

"Our users can have a two-part name, a three-part name or even a four- or five-part name," said Kevin Auger, product-line manager at Novell's NetWare Products Division in Provo, Utah. "With a large corporation, you may need more levels of the tree to more easily identify people."

Analysts say both methods have merit. "I can see some cases where an unlimited hierarchy can be valuable, but that flexibility can carry some gotchas if you don't plan carefully," said Jamie Lewis, vice president of information services at The Burton Group, a consulting firm based in Salt Lake City. "Because StreetTalk is more static, it requires much less preimplementation planning.

"There's no question that a name that is seven levels deep will be hard to remember; people just don't think that way," Lewis continued. "But if you look at Novell's planning guide, it recommends keeping the names as short as possible. In a way, then, they both vehemently agree."

Database divergence

The other primary difference between the two offerings is the way each keeps its directory database. Banyan keeps and updates its database using what it calls a collector/master approach. Basically, collectors throughout the net send updates to a central master, which then distributes the changes back through the net.

Novell partitions its NDS database and replicates those partitions throughout the net (see story, page L1). Novell points out that by using replication, an administrator can keep local the part of the database that a particular department uses most.

"We offer flexibility in how an organization can configure its database," Novell's Auger said. "Replication gives you reliability. If one database fails, there are other pieces of it elsewhere [on the net]."

But Banyan's Wixon pointed out that because the NDS database is so distributed, users may experience extra overhead in

(continued on page L14)

Comparing StreetTalk, NDS

Besides the architectural differences between Banyan Systems, Inc.'s StreetTalk III and Novell, Inc.'s NetWare Directory Services (NDS) naming services, there are other small but critical distinctions between the two approaches.

One disadvantage of StreetTalk is its user interface or lack thereof. "StreetTalk uses an interface that is circa 1985," said Jamie Lewis, vice president of information services at The Burton Group, a consulting firm based in Salt Lake City.

"A directory is such an abstract thing that having it graphically represented gives the administrator an edge," Lewis said. "That is a big advantage Novell has over Banyan."

But one advantage Banyan has over Novell is SreetTalk's ability to search for objects using several attributes. For example, the naming service lets users search for a printer that is on the third floor and is loaded with helvetica fonts as well as the company's letterhead.

Novell's NDS currently only lets users search for objects one attribute at a time, although the vendor has said it plans to add the capability for multiple-attribute searches.

Despite the benefits and drawbacks of each product, Lewis recommends Banyan VINES' StreetTalk as the way to go for new users who must decide today.

In a recently released Burton Group report that provides an in-depth look at NetWare 4.0, NDS and StreetTalk, he wrote: "If you absolutely have to roll systems out now — and if you don't want to be a NetWare 4.0 pioneer and take the risks that pioneering entails — then VINES is probably your best bet."

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Circle Reader Service #10

Banyan, Novell square off on service

continued from page L13

getting information that is not local.

Novell denies that excessive overhead is an issue. But the truth remains to be seen. As Lewis said, NDS has yet to be implemented in large enterprise networks, the only place users will be able to get an accurate assessment of the overhead they will experience.

One major shortcoming of NDS, according to Lewis, is that administrators cannot merge directories.

If, for instance, one department of a company implements NetWare 4.0 and the rest of the company later decides to move to 4.0, the database of the original department cannot be merged into the larger corporate naming scheme.

The primary reason for this is that NDS does not let administrators change organization names within the database once it has been created.

"NetWare has always been a ground-up product; it's usually installed and used independently of a central control," Lewis said.

"Now all of a sudden, 4.0 is a top-down product," he said. "These two worlds are going to collide. And it's not a question of whether this will happen; it's a question of when it will happen."

When it does happen, he continued, "you've got a problem because, with the current release, you can't merge directories."

Lewis did point out that Novell is working to fix this problem. However, he did not know when a solution would be available. ◻

Parallan exec details life after IBM

continued from page L2

from a relatively small company like Parallan, does the IBM relationship help? Do you actually see more people coming in?

Absolutely. There are customers we had been talking to for a long time that purchased units last spring as soon as they heard that this relationship was likely to occur because they had been seeking assurances from us that we understood that problem and we were going to address it.

A general issue that the computer industry is a little slow to understand — and maybe the superserver vendors, in particular — is that technology is an issue but by no means the only issue. Maybe you can sell desktop devices by just identifying which processor, what clock speed, how much memory and how big the disk is, but when you look at MIS' list [of buying criteria], those issues are third, fourth, fifth down the list, if not further.

They're more interested in training costs, the cost of ownership and the ability to upgrade products. They have a very different filter they push stuff through. The things that are coming into play as client/server starts to take on these big corporate applications are exactly the kind of things IBM has been the leader in for years and years — it's a natural area for IBM.

In terms of the future, does Parallan plan to add support for [Microsoft Corp.'s Windows NT] and Unix, as well as some of the other high-end operating systems that users are looking for?

The first thing I would say is that if there's any sense out there that we are constrained by IBM's religious issues about this kind of stuff, we're not. We are going to do the things we need to do to make these products accessible. It's clear to me that would involve getting into additional operating environments in the future.

A lot of Parallan's competitors are committing to support NT and Unix. By not making a statement, is Parallan missing the window of opportunity?

We're making assurances to customers that when it's all over with, we're focused on their applications. We're telling them we're going to be there with machines that suport the applications they want to run.

Maybe we're just acknowledging that we don't know the way the future's going to unfold. For us to stand up today and say that we know, for example, which one will be more important — NT or UnixWare — wouldn't be fair. We just don't know. I'm relying on customers to help me figure that out.

I feel comfortable that we'll have plenty of time to be ready with implementations as people start to roll these things out into production.

If the time comes when Unix is supported on the 95, 195 and 295 machines, do you see IBM having difficulty differentiating those machines from its RISC System/6000 servers?

That would certainly make it more in-

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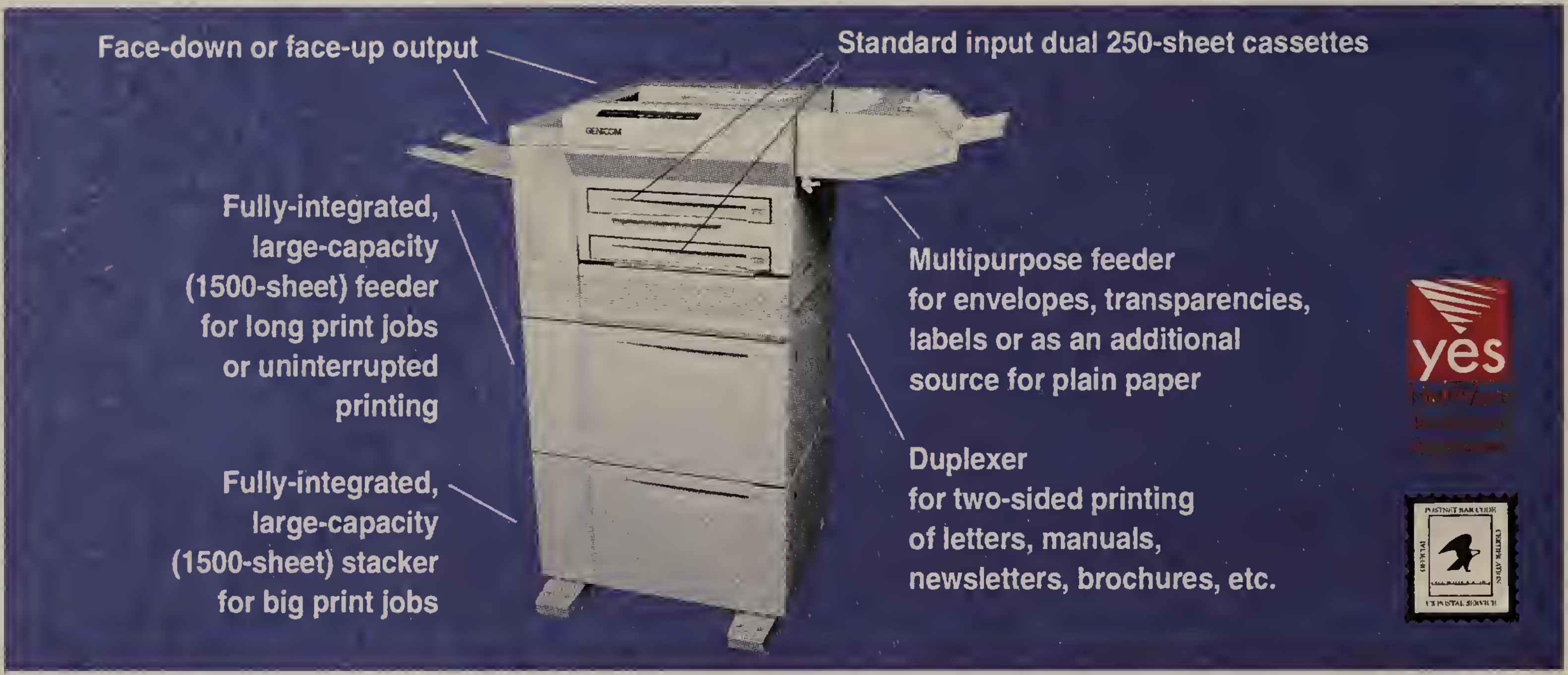
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teresting. With the 195 and 295 focused on OS/2 and NetWare, the positioning is primarily the OS issue itself. Unix tends to still have a loyal set of people who want to use it, and the RS/6000 tends to fit real well into those environments.

But, yes, on the day we put Unix on products like ours, it will become more interesting. It would probably still have a lot to do with the nature of what we're doing. The 295 architecture is optimized toward more high-volume, random access to data, transaction processing, database management and that kind of stuff, where the Unix machines, in general, are more oriented toward helping specialized professionals do more analysis, what-if kind of work.

On the hardware side, Parallan has the top-of-the-line 295, the 195 is in the middle tier, and, below that, IBM has its own product line. In which direction do you plan to scale the product line next?

Our plan has got scaling in both directions in a couple of different ways.

We originally built the 195/295 architecture with lots of extra capacity so we could scale them up as new technologies became available. For example, when we first announced them, they supported two 33-MHz 486s. We've gone back and designed the new CPU boards to let us add one or two 50-MHz processors. We've quadrupled the memory size. The architecture with the independent subsystem and the slide-in boards lets us upgrade the system one piece at a time as new technology comes along.

The 195 and 295 are based around the same inner processor structure we've been using all along — the 64-bit, 200M byte/sec bus. That is still much more throughput than we know how to use.

If you look at NetFRAME [Systems, Inc.] and Tricord [Systems, Inc.], I think you [will] see some interesting product transition issues starting to develop as new technologies expand the speed and capacity so much. They've done things like put their processors and memory on more traditional PC architectures with large motherboards, having that motherboard actually driving the main system buses and having them clocked off the main processors and so forth.

You have to do some extensive surgery on the product to, for example, swap out processors.

As far as going downward, we have talked from the beginning about taking the Parallan value-added stuff, such as the [Maximum Availability and Support Subsystem], and making it available across other IBM platforms, specifically including the lower end Personal System/2 servers like the 95 and 85.

Any time frames for when some of those higher end capabilities might be available on the lower end systems?

I believe IBM has talked about doing that this year, but I don't think they've provided any additional details. That's something a lot of IBM customers are interested in seeing.

If you get a case where some, but not all, features of the 295 can be transplanted, there is a very interesting subset of those [features] that you can do with an add-on or plug-in hardware/software subsystem for a machine like the [IBM Server] 95. It could add a lot of value that would provide a more rational growth path from that product up through the 195 and 295.

And, longer term, we're not just sitting around tweaking our current product. We've done a lot of very extensive work on next generations of products. There, too, we have a goal about scalability. We've talked about making it very easy for people to purchase machines of the size they need and to upgrade them gracefully as their needs change.

Fields

Can you give examples of that?

I can't be very specific and certainly can't discuss any specification or timing issues.

But, in general, there are lots of opportunities to take advantage of technology that wasn't in sight when we started or isn't even in sight today.

It's clear to me that people will find a way to burn up whatever horsepower you place at their disposal.

Further down the road, with more emphasis being put on the need for superservers and more companies coming out with competing products, how will Parallan plan to differentiate itself from its competitors?

We are going to continue to operate through a small-company decision process in terms of time to market. Small companies can make decisions and implement things extremely quickly. But when it

(continued on page L16)

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Circle Reader Service #8

Hubs breathe life into 3270

continued from page L4

method of providing 3270 terminals with access to Unix environments.

With these solutions, the Systems Network Architecture net is typically left in place. Terminal traffic destined for Unix hosts is converted from 3270 to ASCII data in the mainframe or FEP and is redirected to the TCP/IP network and attached Unix hosts. While this is appealing for its centralized implementation, a closer look is required.

Since this solution requires all traffic destined for the mainframe or Unix host to communicate via the SNA network, significant overhead will be added to the mainframe or FEP.

Depending on the type and number of terminal sessions accessing the Unix host, up to twice the current logical unit traffic may occur.

With most centralized solutions, the conversion between 3270 and ASCII data is application-specific and the 3270 conversion software must be programmed for the particular ASCII or Unix application if anything other than a line-at-a-time, or TTY, interface is required.

With the centralized solution, the 3270 terminal user interface to the Unix application will typically be different from the standard VT-100 or VT-220 interface familiar to directly connected users.

As a result, there may be significant training and additional support requirements. Nevertheless, where limited access to a basic Unix application is all that is required, this may prove to be the most cost-effective solution.

3270 access hubs

A third class of networking products, 3270 access hubs, are designed to provide 3270 terminal users with full functionality and integrated access to both SNA and Unix resources over a variety of LAN topologies.

The 3270 access hub replaces the traditional 3174 and 3274 cluster controller and directly connects 3270 terminals to LAN/wide-area network-attached resources.

This not only provides asset protection by allowing 3270 terminals to access traditional mainframe applications over SNA- or TCP/IP-based LANs and Unix applications over TCP/IP-based LANs, it also reduces network costs by eliminating the need for a separate IBM network.

With the modular architecture of some 3270 access hubs, four or five fully configured 3174/3274 cluster controllers can be replaced by a single access hub, reducing management complexity and maintenance costs.

VENDOR VIEW

Access hubs can support more than 250 directly connected terminals and more than 500 3270, TN3270 or Telnet sessions in a single server chassis.

As in newer intelligent wiring hubs, switch technology provides the foundation for the high-capacity, high-performance 3270 access hub.

The use of switch technology also provides the flexibility to mix and match protocols and network connections in a single system, modularly scale the system from 16 to more than 250 terminals and hot-swap various modules without impacting the remaining system.

For accessing Unix hosts, the hubs provide attached 3270 terminals with VT-100, VT-220 and VT-320 emulation and establish a Telnet session with the host. Because the hub communicates directly with the Unix host without going through the mainframe, users interact with the Unix application in true character mode, which allows transparent cursor control and tab-key control.

For accessing mainframe resources from a TCP/IP-based network, the hubs provide attached 3270 terminals with support for TN3270 sessions. This is an important capability in nets in which TCP/IP is the backbone protocol and SNA is limited to the host environment or TCP/IP has been deployed in the mainframe host environment.

The ability to provide 3270 terminals in a TCP/IP-based net with access to both IBM mainframes and Unix hosts significantly reduces network complexity and costs by eliminating the need to bridge SNA data or route encapsulated SNA data and concurrently route TCP/IP traffic.

Fully functioning access hubs should also provide support for printing from the Unix host to the IBM 3287-type coaxial cable printer, obviating the need for a dedicated LAN printer.

This is typically accomplished via a standard print protocol such as Line Printer Resource/Line Printer Daemon or the more traditional Sockets-type print facility. Support for the Simple Network Management Protocol should also be provided as a standard capability for 3270 access hubs in TCP/IP environments.

Access hubs offer transparent gateways between SNA and TCP/IP networks, enabling customers to access mainframe and Unix applications from existing 3270 terminals, thereby minimizing the capital investment required for deploying rightsized applications.

Gordon is chairman and chief executive officer of Apertus Technologies, Inc., a provider of LAN-to-mainframe connectivity products located at 7275 Flying Cloud Drive, Eden Prairie, Minn. 55344; (612) 828-0300.

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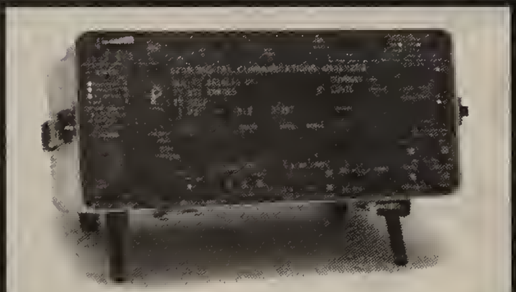

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ATM price barriers falling

continued from page L2

Corp., a consulting firm in Voorhees, N.J., sees the reductions as addressing only the top tier of commercial users that are employing Unix workstations instead of personal computers and spending $35,000 to $45,000 per desktop system, as opposed to $7,000 to $9,000 for PCs.

"The per-port price of ATM has to fall to half of even the current reduced levels before it can become broadly competitive," he said. "Even with the price reductions, we still lack a lot of important pieces required for widespread commercial use, including the development of an ATM adapter for a PC bus."

And widespread commercial use is still many years down the road. According to figures compiled by Forrester Research, Inc., a market research firm in Cambridge, Mass., ATM LAN revenues were only $10 million in 1992 and will be no higher than $25 million this year.

Paul Callahan, senior analyst at Forrester, said the lower prices cannot overcome the technology's immaturity.

"The price drops are not going to fuel an explosion because without some type of internetworking capability, ATM is not getting out of the labs," he said. "Apart from Cabletron [Systems, Inc.'s] Bridge/Router Interface Module announcement that basically puts ATM modules on top of a routing engine, there is no way to connect current LAN technology to ATM without routers."

Besides technological maturity and internetworking capabilities, users also need assurances of interoperability among various vendors' ATM products.

The standards process has been moving along at a good pace and some standards should be finalized soon, said Mark Juliano, director of marketing at Fore.

"Users will determine how much of the standard needs to be in place before they start to buy," he said.

Parallan details life after IBM

continued from page L15

makes sense to do it, we can change personalities and, suddenly, we're IBM in terms of our ability to promote merchandise and sell and support products.

I think it's going to be hard for anybody to figure out how to emulate that. Everybody else in the business is going to be one of those two personalities, but it's going to be the only one they have. Even if they can develop products quickly, they're going to have the same issues we used to have about limited feet on the street in terms of sales and support, and they're going to face the exact same scrutiny we faced from large companies saying, "Gee, I don't know how to depend on a company your size."

Anybody big enough to field the sales and support staff required is going to have a problem with moving quickly in terms of defining and developing products.

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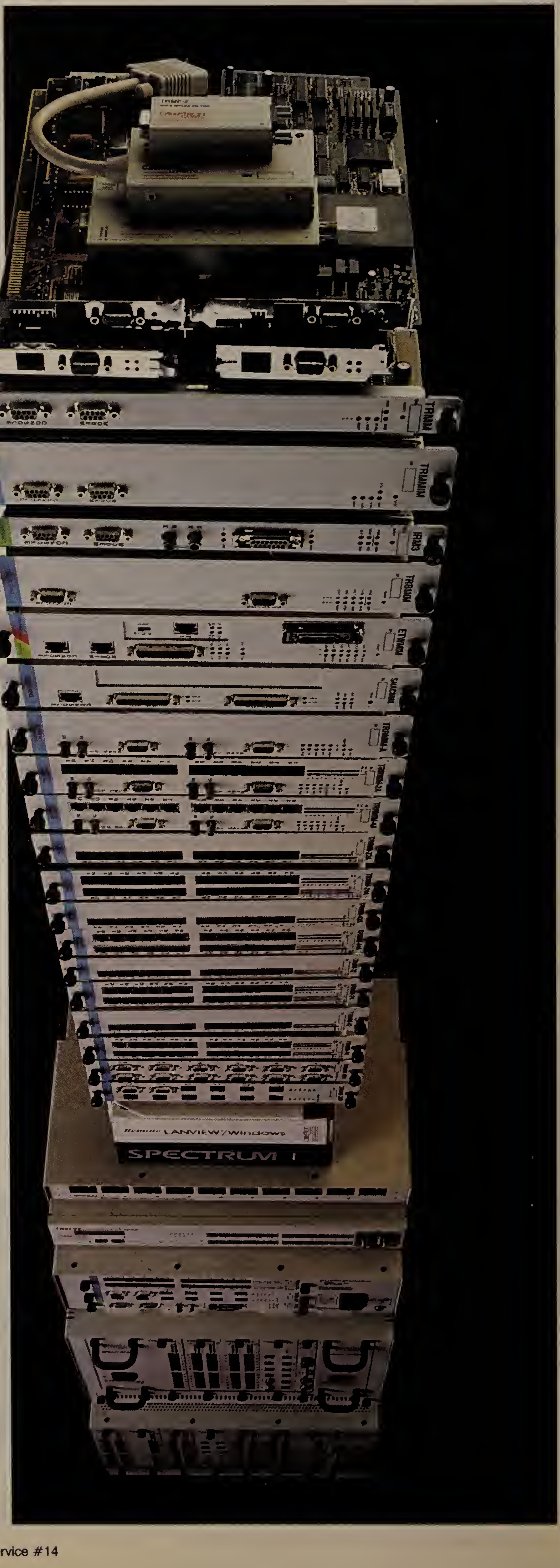

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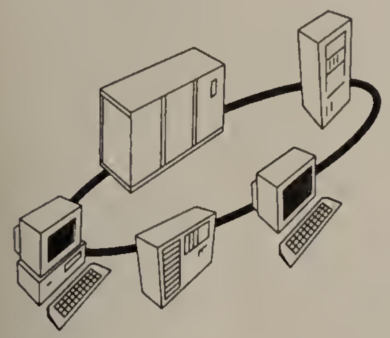

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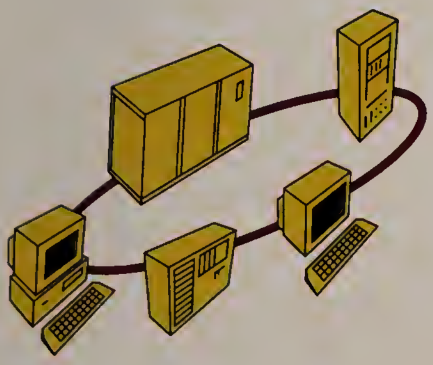

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Circle Reader Service Number 1

INTERNETWORKS

LAN-TO-LAN AND LAN-TO-WAN EQUIPMENT AND STRATEGIES

Worth Noting

> "It is the hub
> endors' strategy to
> liminate their
> ependency on the
> :outer makers].
> hey'll get there, but
> ıey still have miles to
> o before they sleep."

Paul Callahan
Senior analyst
Forrester Research, Inc.
Cambridge, Mass.

Link Notes

Ungermann-Bass, Inc. ast week rolled out a new line f fault-tolerant power sup-lies for the 11-slot Access/)ne Enterprise Hub that is de-igned to provide fault man-gement and disaster recov-ry support for mission-ritical nets.

The second-generation de-ices improve on their prede-essors by supplying an addi-ional 100 watts of power, a ot-swappable fan assembly, nd LEDs for power and tem-erature status.

The supplies, which can utomatically sense and ad-ust to the available AC, will hip in four models.

The power supply models ange in price from $1,500 to 3,995.

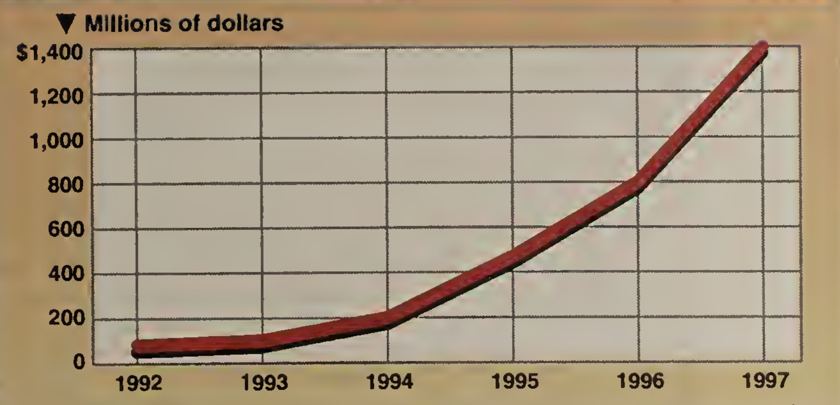
UB: (800) 777-4526.

ACE Communications, Inc., an affiliate of Harris Adacom, announced that it has acquired IBM internetworking vendor **North Hills Electronics, Inc.** for almost $10 million.

According to ACE President Edward Grace, the acquisition will provide the combined company with an enhanced product line for local-area network and IBM mid-range environments.

In addition, it will expand the new firm's worldwide distribution and support.

Demand for dial-up internetworking poised to explode



Revenues for dial-up routers and remote application products to accommodate the remote and roving user will balloon to $1.4 billion by 1997.

GRAPHIC BY SUSAN J. CHAMPENY   SOURCE: FORRESTER RESEARCH, INC., CAMBRIDGE, MASS.

FDDI support for Hughes Enterprise Hub has arrived

Vendor also unveils token-ring bridge module.

By Skip MacAskill
Senior Writer

MOUNTAIN VIEW, Calif. — Hughes LAN Systems, Inc. last week rolled out the first Fiber Distributed Data Interface products for its intelligent hub line, making good on a promise it first made 1½ years ago.

The devices — an FDDI Concentrator module and a multiport FDDI/Ethernet Bridge module — fill what had been a glaring gap in Hughes' Enterprise Hub line and bring the company up to speed with other high-end hub makers that have been shipping FDDI products for some time.

When Hughes first announced the Enterprise Hub in the fall of 1991, it expected to deliver the FDDI support by the second quarter of the following year. By mid-1992, however, the company decided to revamp its rollout schedule in light of an emerging technology that was just starting to make waves at the time.

"When [Asynchronous Transfer Mode] began to grow in importance, we shifted some of our engineering resources from the token-ring and FDDI development projects to the ATM effort, which naturally pushed back rollouts on the traditional LAN gear," said Jackie Ross, director of field marketing at Hughes.

The concentrator module, which operates at the standard 100M bit/sec, is a dual-attached device that supports ANSI X3T9.5-compliant devices at up to 2 km via six multimode fiber ports. It can be configured to support a total of six single-attached stations (SAS) or four SASes and one dual-attached station.

The four-port bridge module performs translation bridging between three Ethernet local-area network segments and an FDDI backbone, providing peer-to-peer communications between Ethernet and FDDI end nodes. The bridge, which has a Reduced Instruction Set Computing (RISC)-based processor, filters at full line speed on each Ethernet port and has a high-speed forwarding rate of three full Ethernets per FDDI ring.

RISCy management

As with all Enterprise Hub modules, the FDDI offerings have a built-in RISC-based Simple Network Management Protocol agent, eliminating the need for a dedicated net management hub module. The SNMP agent compiles net information and offers port-level monitoring for errors, collection of performance statistics, logical and physical ring maps, port locking security and software-selectable ring connections. Each module also supports Management Information Base (MIB) II, the Remote Monitoring MIB and Version 7.0 of the Station Management protocol.

The new FDDI products play off Hughes' Adaptable Ring Backplane (ARB), which allows each concentrator module to be configured as an individual ring or connect with any other concentrator module to form a ring. The ring-per-slot feature enables a 14-slot Enterprise Hub to support

(continued on page 26)

Eicon upgrades SNA, OSI gateway versions

Vendor to provide first NetWare Loadable Module alternative to Novell's NetWare for SAA offering.

By Maureen Molloy
Senior Editor

MONTREAL — Eicon Technology Corp. next week will announce new NetWare Loadable Module (NLM) versions of its SNA LAN Gateway and OSI Gateway.

Eicon will also announce its intentions to support the Windows NT operating system via three new Systems Network Architecture and wide-area network products.

The SNA LAN Gateway and Open Systems Interconnection Gateway can be directly installed on a NetWare file server, as well as on MS-DOS or OS/2 servers.

The SNA LAN Gateway is the first NLM version of an SNA gateway other than Novell's own NetWare for Systems Application Architecture. Delivering the product as an NLM boosts the number of host sessions supported from 150 to 1,016 — or four 254-sessions per server.

Eicon's SNA Gateway links local-area network workstations running DOS, Windows or OS/2 to virtually all IBM systems in an SNA net. Using Eicon's or other third-party's 3270 and 5250 terminal emulators, users can link to IBM hosts via Synchronous Data Link Control lines, X.25, token-ring or Ethernet nets. Advanced Program-to-Program Communications/LU 6.2 and LU 0 sessions are also supported.

The OSI LAN Gateway lets workstations running DOS, Windows or OS/2 access electronic mail systems, public databases and Transmission Control Protocol/Internet Protocol hosts via an X.25 net. The new version adds support for remote net management and replaces the existing command line interface with a Windows-, DOS- or OS/2-based graphical user interface.

SNA and OSI LAN Gateways can be installed on the same server and share the same X.25 link. Eicon's router software can also be installed on the same server for simultaneous LAN-to-host and LAN-to-LAN networking over

(continued on page 26)

Artisoft rolls out low-end Ethernet concentrators

By Skip MacAskill
Senior Writer

TUCSON, Ariz. — Two Ethernet concentrators from Artisoft, Inc. that provide users with low-cost 10Base-T options for work group and departmental local-area networks made their debut last week.

The unmanaged stand-alone hubs — the eight-port T-Runner 800/TC and 12-port T-Runner 1200/TC — offer RJ-45 unshielded twisted-pair connections and support a variety of network operating environments such as Artisoft's LANtastic and Novell, Inc.'s NetWare.

Each model, which can support any IEEE 802.3-compliant device, comes equipped with a BNC connector that allows users to link concentrators via thin coaxial cable.

In addition, the BNC port can be used to mix different cable types, enabling users on a 10Base-T segment, for example, to connect to and communicate with users on a coaxial cable segment.

The T-Runner 800/TC and 1200/TC also include an auto-partitioning feature that automatically disables a faulty port experiencing a hard error, such as a cable failure or cut, while allowing the devices connected to the other ports to function without interruption.

According to the company, users wanted a stand-alone device that would complement the firm's Peer-Hub Internal Concentrator, a personal computer-based hub card.

Available this summer, the 800/TC is priced at $449, while the 1200/TC is tagged at $749.

Artisoft: (800) 846-9726.

A disk problem causes you incredible discomfort. A lapse in memory takes its toll on your entire system. It wasn't anyone's fault. But now it's yours. Because if it affects the LAN, you're the one who has to deal with it.

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Introducing the PS/2® Server 195. A server that stares failure in the face. Then succeeds. An enterprise server that delivers rock-solid reliability, around-the-clock availability, remarkable scalability and affordability.

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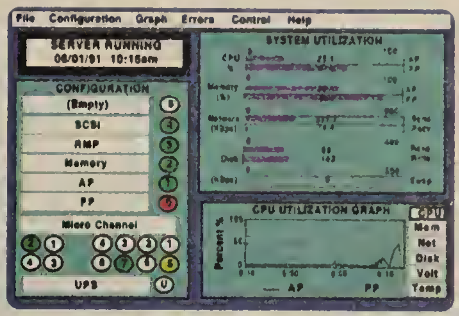
The new Server 195 is configured and built to order. The base system is Novell® NetWare® Tested and Approved, and also runs OS/2®, OS/2 LAN Server and LAN Manager. You get 32MB of ECC memory, a 486 DX/50 MHz processor and RISC-based processors on each of the two standard SCSI channels and memory controller for starters. Up to 28GB of hardfile storage is available. And since the Server 195 is completely upgradable—to PS/2 Server 295 specs—you can add subsystems to achieve a higher level of fault tolerance when and where it makes sense.

With the Maximum Availability and Support System/2 (MASS/2) option, the Server 195 provides comprehensive local and remote server monitoring, control, tuning

*Available from IBM, M-F, 8 A.M. to 5 P.M. in your time zone. **For information regarding the terms of IBM's money-back guarantee and limited warranty, please call 1 800 772-2227. Copies of IBM's money-back guarantee and statement of limited warranty are available upon request. IBM, Micro Channel, PS/2 and OS/2 are registered trademarks and HelpWare and HelpCenter are trademarks of International Business Machines Corporation. Novell and NetWare are registered trademarks of Novell, Inc. ©1993 IBM Corp.

It even tolerates

and recovery capabilities. MASS/2 works with a battery backed-up Remote Maintenance Processor (RMP) option that can notify you of errors, failures, corrective action taken—even provide system access during a power failure. And you can extend fault tolerance to the entire disk subsystem by adding an Orthogonal RAID-5 Disk Array/2.



The MASS/2 option has a user-friendly GUI that lets you distribute computing power across your organization from a central location.

Server 195/295 Comparison

Feature	Server 195	Server 295 Model 1	Server 295 Model 2
Remote Maintenance Processing and Modem	optional	standard	standard
Processors	486/50 MHz	MP-486/33 & 50 MHz	MP-2 486/50 MHz
Available Slots	8 Micro Channel®	12 Micro Channel	12 Micro Channel
MASS/2	optional	standard	standard

Like all PS/2s, the Server 195 is backed by IBM HelpWare™—a range of service and support so complete, it's hard to find fault with. You get a three-year on-site warranty with four-hour average response time;* around-the-clock set-up, usage and service assistance on IBM hardware and software during warranty;** a 30-day money-back guarantee** and more. For more information or an IBM certified dealer near you, call our Personal Systems HelpCenter™ at 1 800 772-2227 or TDD ASCII 1 800 426-4238. In Canada, call 1 800 465-7999. The new PS/2 Server 195 is so reliable, why would you tolerate anything less?

IBM®

your worst faults.

FDDI support for Hughes hub arrives

continued from page 23

14 FDDI rings.

With ARB, net managers can logically reconfigure the FDDI rings via any SNMP-based net management system without physical intervention, network disruption or specialized software.

The FDDI Concentrator module, available next month, costs $9,995, while the bridge module is priced at $14,995 and will be available in August.

In conjunction with the FDDI rollout, Hughes also announced the Multi Port Token Ring Bridge module for the Enterprise Hub.

The RISC-based product has three ports to connect internal token-ring LAN segments across the hub's backplane. A fourth port is switchable between the backplane and an external token-ring connection for backbone connectivity or for bridging between hubs.

Available next month, the bridge costs $7,995.

Hughes: (800) 395-5267.

Eicon upgrades SNA, OSI gateway versions

continued from page 23

a single X.25 line.

Both gateways can be managed from any personal computer on the internet using Eicon's Simple Network Management Protocol-based Interconnect Server. In addition, the gateways can be managed remotely from a central host site via IBM's NetView or System Center, Inc.'s Net/Master network management platforms.

The gateways range in price from $795 to $1,195 and are available now.

The first of Eicon's new Windows NT products is WAN Services for Windows NT, software that runs on an NT-based workstation to give NT applications access to wide-area X.25 and SDLC links. The company said it will later add support for Integrated Services Digital Network and frame relay nets.

WAN Services for Windows NT will also enable Microsoft's soon-to-be-announced NT mail system to link to X.400 messaging systems through an X.25 net.

The second product, dubbed Access for Windows NT 3270, is a 3270 display and printer emulation package for stand-alone or LAN-based PCs running Windows NT. It includes all the standard features of IBM 3270 displays and printers as well as IBM 3270-PC File Transfer. It supports connections to the host via token ring, Ethernet, SDLC and X.25.

> ICS can be configured and controlled from a Windows-based console supporting SNMP and NetView.

▲▲▲

The third product is called InterConnect Server (ICS) for Windows NT and integrates the functions of a multiprotocol router and a multiprotocol gateway.

It supports the routing of TCP/IP traffic and can also be used as a gateway for workstations emulating IBM 3270 and 5250 terminals as well as non-IBM terminals.

ICS can be configured and controlled from a Windows-based console supporting the Simple Network Management Protocol and NetView.

WAN Services for Windows NT and Access for Windows NT 3270 will be available next quarter, while ICS for Windows NT will be available by mid-1994. Pricing has not yet been set.

Eicon: (514) 631-2592.

Get in touch with the R.A.F.

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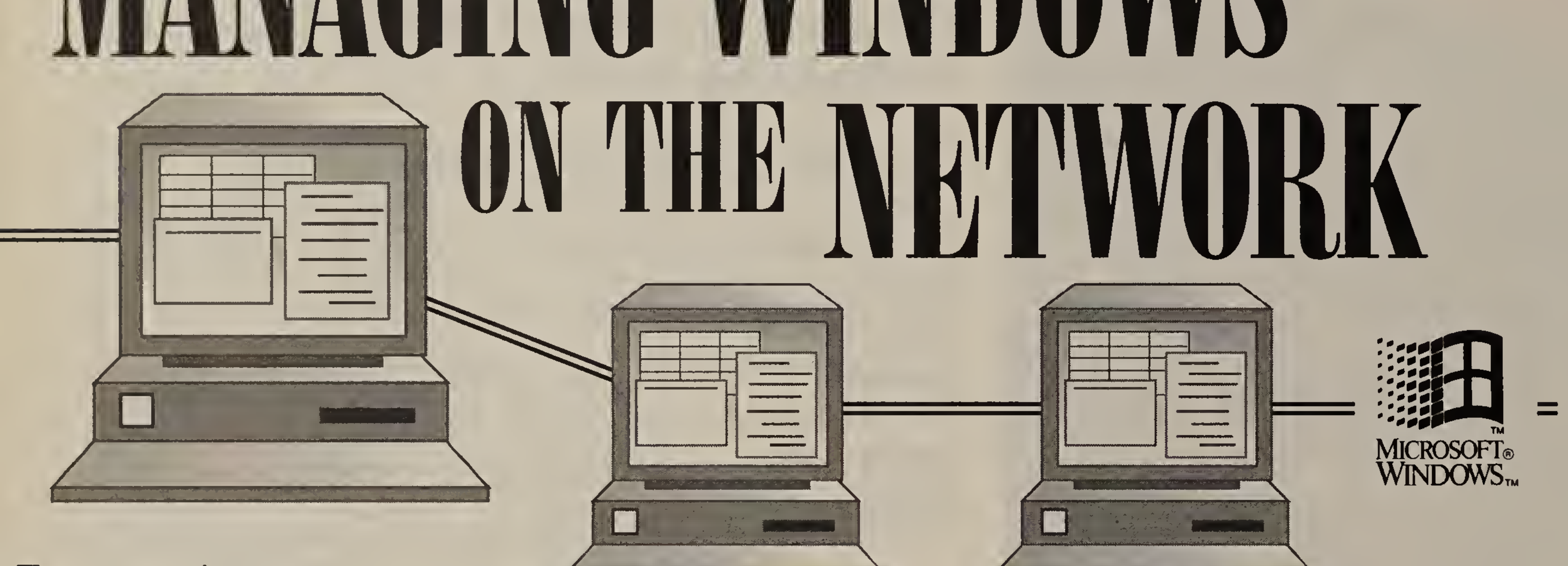
NETWORK WORLD'S

R.A.F.

READER ADVOCACY FORCE

MANAGING WINDOWS™ ON THE NETWORK



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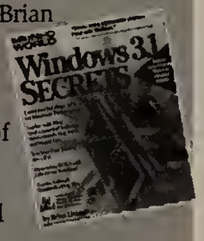

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Circle Reader Service #20

GLOBAL SERVICES

DOMESTIC AND INTERNATIONAL VOICE/DATA SERVICES, ACCESS EQUIPMENT AND REGULATORY ISSUES

Worth Noting

AT&T last week said its new CDROM-based billing offering can hold roughly 650,000 call detail records on a single CD, the equivalent of a 10,000-page paper bill.

Carrier Watch

Sprint Corp. and **MCI Communications Corp.** announced international extensions to their respective frame relay services at the International Communications Association ComNet '93 conference in Dallas last week.

Sprint will offer frame relay service to users in Japan and Hong Kong, and is now taking orders for connections from those countries to sites in Canada, France, Germany and the U.K.

The carrier will deploy at least one and possibly several of its internally developed TP4900 packet switches in Japan and Hong Kong. Sprint will support access port speeds of up to 256K bit/sec on the switch.

Sprint said it plans to offer frame relay to 25 countries by year end. The carrier is among the first of the service providers to announce plans to offer frame relay service to sites in the Pacific Rim.

Frame relay to Japan and Hong Kong is scheduled to be available by midyear. Sprint will begin offering the service to users in Australia and New Zealand next month.

For its part, MCI announced that it will offer its frame relay service to users in the U.K. beginning in September. The carrier will support port access speeds of up to 256K bit/sec. MCI said it plans to extend its frame relay service to users in Japan soon, but declined to say when.

AT&T signs, seals, delivers all-new SDN service bills

Redesigns to improve billing, reporting capabilities.

By Daniel Briere
Contributing Editor

BASKING RIDGE, N.J. — AT&T Software-Defined Network service customers that have been watching and waiting for more readable and concise long-distance bills will go to their mailbox this week and find their heart's desire — a totally overhauled SDN bill.

"We threw away the old bill and simply recreated what the end users wanted," said Rob Flowers, business analyst for SDN billing at AT&T. "Our customers told us two things — clean up your bill and give us new media options. We did both."

The new bill comes on the heels of other efforts by the SDN staff to enhance the service's billing and reporting capabilities. Just last week, AT&T launched a new CDROM delivery program for SDN customers (*NW,* May 17, page 2).

Out with the old

Flowers and other AT&T SDN staff met face-to-face with more than 10% of the overall SDN customer base to assess everything that was wrong with the old bill and to redesign its content. This week's bill shipment caps a 16-month effort by AT&T.

For most users, the improvements will be evident. AT&T condensed the previous 24 reports into 18, and launched a new report, the "SDN Discount Report," that deciphers for customers the prediscount and postdiscount fees for all call types.

"A lot of manual and personnel-intensive effort will disappear overnight with this single report," Flowers said.

Carl Wood, operations and communications manager at Hudson Foods, Inc. in Rogers, Ark., played a large role in creating the new format as chairman of the billing subcommittee of the SDN Technical Advisory Committee.

"Key information is available in plain English," Wood explained. "We used to load data into a spreadsheet to calculate costs per minute. It took hours. Now the Discount Report gives it to us."

AT&T also consolidated various key service facts and figures into a two- to four-page summary of the SDN bills, giving the user a super summary of that month's traffic, according to Flowers.

Bills are also more readable; where reporting before was a mixture of landscape and portrait formats, AT&T standardized on the latter. This enables the carri-

(continued on page 28)

Survey shows large net projects being put on ice

By Bob Wallace
Senior Editor

DALLAS — Tough economic times have forced upper management to freeze network projects they thought would give their firms a competitive edge, according to a user survey released at the ICA ComNet '93 conference here last week.

The "Annual Survey of North American Telecommunications Issues" was conducted by Deloitte & Touche, a management and consulting firm, and the International Communications Association. It comprises responses from network managers at 200 large U.S., Canadian and Mexican firms in 13 vertical industries.

"It's a bad time to have strategic projects under way because so many companies have decided to cut costs rather than spend for a competitive edge," said Paul Kirvan, vice president of The Kingswell Partnership, Inc., a Turnersville, N.J., consultancy, and a former network manager.

The survey results support Kirvan's claim.

Not right now

Of the survey respondents, 63% said large capital expenditures or major projects have been delayed or eliminated.

In addition, most users do not think things will change in the

(continued on page 28)

MCI launches videoconferencing service

The service at a glance

Platform:	PictureTel Corp. M-8000 video bridge
Access options:	
Switched:	MCI's switched 56K or 64K bit/sec service
Dedicated:	MCI's T-1 or ISDN Primary Rate Interface
Link speeds:	112K or 128K bit/sec connections, or up to 336K bit/sec links using Ascend Communications, Inc. Multiband inverse multiplexers
Maximum sites bridged:	Up to 16 in a single multipoint videoconference
Pricing:	Usage-sensitive basis for transmission and bridging; multipoint bridging charges of $1.00 per minute, per site

GRAPHIC BY SUSAN J. CHAMPENY SOURCE: MCI COMMUNICATIONS CORP., WASHINGTON, D.C.

MCI makes its move in video calling mart

Unveils VideoNet package; says recent market developments allow for more affordable service.

By Bob Wallace
Senior Editor

DALLAS — MCI Communications Corp. last week announced MCI VideoNet, a package of switched digital services and equipment for point-to-point and multipoint videoconferencing on a national or international basis.

According to Paul Weichselbaum, vice president of data marketing for MCI, aggressive carrier deployment of switched digital services coupled with plummeting videoconferencing coder/decoder prices portends to make videoconferencing affordable for the masses.

"These developments are expanding the videoconferencing market," Weichselbaum said. "They're enabling us to put the video tools in more users' hands than we could ever have done before."

MCI is the last of the Big Three to announce a videoconferencing service, said Daniel Briere, president of TeleChoice, Inc., a Verona, N.J., consultancy. "What's most attractive about MCI's service is the equipment leasing program. Other than that, the services are similar."

In a separate development, Sprint Corp. announced that its Sprint Video customers will be able to use a personal computer to make reservations for videoconferences.

To use MCI VideoNet, firms must have PictureTel Corp. videoconferencing systems on their premises. The carrier said it plans to develop additional equipment and bridging agreements with vendors such as Compression Labs, Inc.

In order to establish the video link, the PictureTel system dials up two switched 56K or switched 64K bit/sec links to a PictureTel M-8000 bridge in the MCI network. MCI calls this two-channel mode.

Users that want higher quality videoconferences need an MCI-provided Ascend Communications, Inc. Multiband inverse multiplexer with a T-1 or Integrated Services Digital Network Primary Rate Interface (PRI) at each conference site.

These devices build high-speed links by synchronizing multiple switched channels so they appear as a single link. As many as six switched 56K circuits can be combined for a single videoconference at 336K bit/sec.

Weichselbaum said VideoNet can support as many as 16 simultaneous locations for a single videoconference.

Customers can choose from two VideoNet service plans: VideoNet Basic Service and VideoNet Premier Service. The first is designed for firms that manage their own video nets — primarily for point-to-point conferences.

When these customers need to establish multipoint videoconferences, they dial an MCI-provided 800 number to the carrier's reservation agents who schedule conferences. The MCI reservation system automatically sends confirmation to designated users via electronic mail or facsimile.

With the carrrier's VideoNet

(continued on page 28)

MCI makes move in video calling mart

continued from page 27

Premier Service, firms get the VideoNet basic services, plus seven-day, 24-hour dial-up access to an automated reservation system for scheduling and system information.

Under a special lease agreement between MCI and PictureTel, users can lease videoconferencing products, including the PictureTel System 4000, for as little as $499 per month, a price that analysts predicted users would take advantage of.

"That's a phenomenal price," Briere said. "This will open up videoconferencing for companies that can't afford capital equipment expenditures in this rough economy."

MCI and PictureTel each will provide service and maintenance through a single 800 number, as well as equipment installation and customer training.

MCI VideoNet service is priced on a usage-sensitive basis for both transmission and bridging. Multipoint bridging charges are $1 a minute per site, regardless of the bandwidth used.

MCI will provide location-level billing, reports and a choice of billing delivery media.

Weichselbaum said MCI plans to enhance VideoNet to support codec conversion, which will enable codecs from different vendors to interoperate. Both items will be provided by year end.

"Users are demanding videoconferencing across different vendors' systems," Briere said. "They'll expect arrangements with other leading vendors and codec conversion ASAP." ☑

AT&T signs, seals, delivers new bills

continued from page 27

er to pack more into each report, trimming the amount of paper going to customers. AT&T deleted complex or misapplied language, too, so report titles now better reflect content.

"The end result of these improvements is a more understandable bill, a lot less paper and no need to run magnetic tapes to get information," Wood said.

More to come

Product managers see the new bills as the first fruit of a major overhaul of the SDN billing and reporting system. AT&T has largely divorced the SDN billing process from its previously closely aligned Private Line Biller, an older analog private-line billing system that uses different formats.

"Before, we were tied to the Private Line Biller version," Flowers said. "Now we are free to develop the system as our users require."

One of the first big steps on tap is to increase the hierarchical billing levels allowed under SDN to match reporting levels. Users today receive SDN usage reports that reflect five hierarchical levels, but billing has been limited to two.

These architectural changes will mean more billing enhancements for SDN users down the road. "It is far easier to control and design new features when development is under one roof," Flowers said. ☑

Survey shows large projects on ice

continued from page 27

near future.

According to 38% of the respondents, the general conditions regarding major capital expenditures and projects will remain unchanged, while 22% said the situation will worsen to some degree. The remainder expect things to improve or had no opinion.

Survey respondents said simple payback period analysis is clearly the most frequent method of justifying major projects and expenditures. Roughly half of the respondents said the benefit levels necessary to justify a project or investment are being set higher.

What benchmark?

One item that disturbed analysts regarded benchmarking telecommunications operations.

Fifty-six percent of the respondents said they had not recently compared or benchmarked their telecommunications costs against their peer group or competition.

Deloitte & Touche studied user responses by vertical market and concluded that financial services, banking, retail and manufacturing firms were more likely to have done some benchmarking, while utilities, government and education sectors have not seriously pursued benchmarking.

"Too many network managers are finding that they're just too busy with day-to-day operations to compare telecom spending and [perform] benchmarking," Kirvan said. ☑

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E n N E
AWARDS

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ENTERPRISE APPLICATIONS

CLIENT/SERVER AND ENABLING SOFTWARE: DISTRIBUTED DATABASE, MESSAGING, GROUPWARE AND IMAGING

Worth Noting

> "I think the SQL database business is becoming a bit of a commodity business. They are all pretty much selling the same thing."
>
> **Ian Schmidt**
> Director of desktop
> and network products
> Object Design, Inc.
> Burlington, Mass.

Store & Forward

Saros Corp. recently began shipping a new version of its Mezzanine file management system. Mezzanine Version 3.0 now runs on a variety of Unix servers, including Hewlett-Packard Co. HP/UX and Data General Corp. DG/UX, and supports Macintosh clients.

In addition, Mezzanine 3.0 provides a way to manage and control Object Linking and Embedding links and objects, as well as supports content-based retrieval querying capabilities.

Available now, Mezzanine 3.0 costs $325 per workstation.

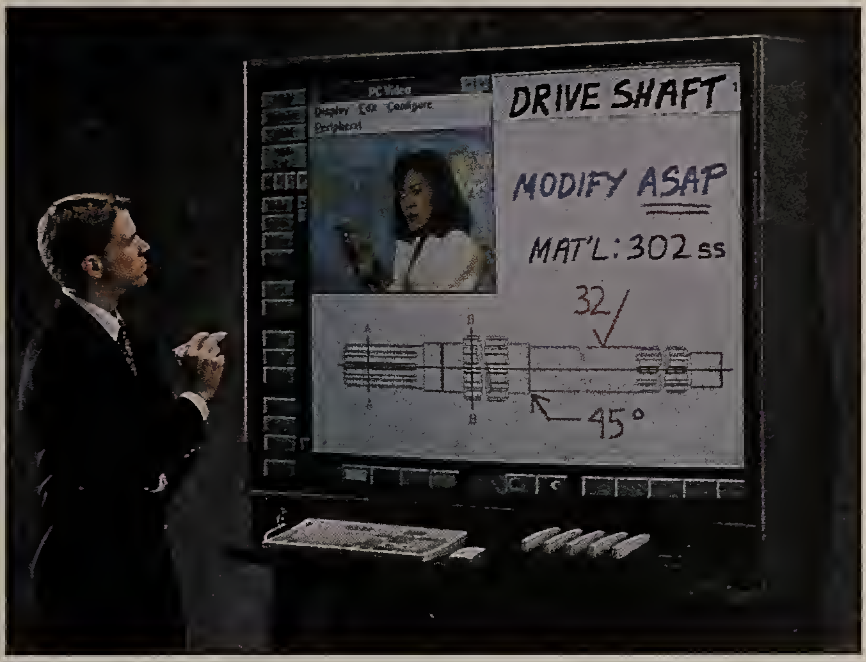
Saros: (800) 827-2767.

XcelleNet, Inc. recently announced enhancements to its RemoteWare software for managing communications between a central site and remote offices.

The software now supports mobile users and enables concurrent access to centrally stored information. Other features let users initiate transactions locally or remotely, establish sequential or conditional paths for routing forms, and create reports and documents that include graphics, text and images.

The enhanced version will be available in June.

XcelleNet: (404) 804-4100. ◻



A user demonstrates the capabilities of Xerox's LiveBoard.

Xerox unit connects users via networked whiteboard

Offers common work surface for multisite workers.

By Bob Brown
Senior Editor

PALO ALTO, Calif. — Xerox Corp.'s Group Communications business unit last week introduced an interactive, electronic whiteboard designed to provide business teams in different locations with a common work surface.

LiveBoard is a 36- by 48-in. whiteboard equipped with a wireless pen that lets users create illustrations in one location that will appear instantly on a whiteboard at another site connected by typical telephone lines. Currently, the system only supports point-to-point links, but Xerox plans to add multipoint support down the road.

Whiteboards can also be attached to a local-area network. This allows spreadsheets and other applications running on the net to be projected on the whiteboard and for changes made to the application at the whiteboard to be made automatically on the network copy, as well.

LiveBoard is based on an Intel Corp. 80486 processor and proprietary software from Xerox that runs on Microsoft Corp.'s Windows 3.11 and supports Microsoft's Pen Extensions for Windows.

Xerox currently requires users to establish a separate audio link to complement the visual discussion on the whiteboard but is looking to more tightly integrate audio in future versions of the product.

LiveBoard features four expansion ports enabling attachment of scanners, printers and other network devices. Other features include live videoconferencing via a window on the whiteboard, as well as an integrated keyboard and mouse for text-intensive applications.

LiveBoard is available now for $49,500 per site.

Xerox: (415) 812-5003. ◻

Sybase to reignite client/server tool biz

Company will soon release its big plans for the apps development tool mart, client/server scheme.

By Bob Brown
Senior Editor

EMERYVILLE, Calif. — Database server supplier Sybase, Inc. this summer will kick off an initiative to grab a bigger slice of the increasingly strategic client/server application development tool market.

Sybase next month plans to formally reveal its development tool vision, which will feature a heavy emphasis on helping users create graphical applications that are easy to use. The company will also lay out its overall client/server strategy, as well as announce new products and product enhancements, but company officials declined to release any details.

Sybase is hardly alone among the database vendors making a bigger push in the tool market, said Donald DePalma, a senior analyst at Forrester Research, Inc. in Cambridge, Mass. Both Oracle Corp. and Informix Software, Inc. have recently made major efforts in this area.

"The back-end [database server] business is perceived to be a commodity business," he said. "Database vendors see tools as an area where they can add some value."

Frank Strelau, Sybase's director of tools product marketing, said Sybase has a two-pronged tool strategy to meet the needs of users seeking help in building client/server applications. The strategy entails satisfying one base of end users and developers set on doing things as they currently do and another that is ready to move forward, he said.

Sybase will continue catering to the hoards of developers and end users who are accustomed to dealing with character-based and simple graphical user interface (GUI)-based tools and applications via its APT Workbench products. These tools optimize the deployment of character- and GUI-based applications, largely for decision support and "heads-down data entry," Strelau said.

> Sybase is hardly alone among the vendors making a bigger push in the tool market.
>
> ▲▲▲

Upcoming enhancements to these products, which now run on Digital Equipment Corp. VMS and various Unix platforms, will include support for new platforms, including MS-DOS, Microsoft Corp.'s Windows and DEC's AXP/OpenVMS.

To address demand for a new generation of distributed client/server applications, Sybase will rely on the GainMomentum tools it acquired last September after purchasing Gain Technology. These object-oriented tools are designed for building on-line transaction processing and mission-critical applications.

(continued on page 35)

Firms bolstering products with groupware features

By Wayne Eckerson
Senior Editor

As the market for work group computing applications heats up, many vendors are racing to add group calendaring and other groupware features to existing products.

Digital Equipment Corp., for example, has teamed up with the leading maker of group calendaring software, Powercore International, Inc., to release a version of Powercore's Network Scheduler 3 group calendaring software that works with DEC's TeamLinks. TeamLinks is client/server software that supports conferencing, file browsing, electronic mail and work flow capabilities on DEC Pathworks nets.

Also, Jensen-Jones, Inc. will ship next month a work group-enabled version of its popular Windows-based personal information management software.

Previously a stand-alone product that provided contact, task and basic scheduling management capabilities, Commence 2.0 now lets groups of users share information across Novell, Inc. NetWare, Microsoft Corp. Windows for Workgroups and most other local-area networks.

Specifically, Commence 2.0 supports group calendaring and a database synchronization feature that allows remote users to synchronize their local databases with the group database each time they log on to the LAN.

Also, Commence 2.0 supports a work flow dialog box that allows users to define triggers and actions for automating routine business tasks, for instance.

(continued on page 35)

Announcing LAN printers smart enough to connect to your PCs, your Macs, your workstations, and your future.

THE NEW IBM LASERPRINTER 4039

Five new LaserPrinters deliver 10, 12, or 16 pages per minute. And the smartest price/performance/connectivity package in the business.

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For starters, a single internal network card connects the new IBM LaserPrinters to multiple network operating systems, *simultaneously*. And the card's flash memory lets you download new operating systems or update current ones, without touching the printer. So your printer stays compatible. And your investment stays intact.

Lexmark's Ethernet and Token-Ring cards give you bi-directional communications, too—so LAN managers can troubleshoot their printers without leaving their desks.

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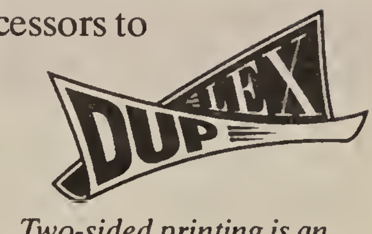
Add a Lexmark AppleTalk card and IBM 4033 external LAN adapter (Token-Ring or Ethernet) and you can configure any LaserPrinter for just about any mix of environments—or *re*configure just as easily. (Either way, Lexmark's network-savvy Quick Start installer makes setup a fast, one-step process.)

There are five new LaserPrinters, with 10, 12, or 16 pages per minute, and fast RISC processors to maximize throughput. And each model gives you all this flexibility and connectibility. So you don't have to buy a big, expensive printer to get multi-environment connectivity.



Two-sided printing is an option on every model, to save paper and filing space. And help save the environment.

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INDUSTRY UPDATE

VENDOR STRATEGIES, MARKET TRENDS, ALLIANCES AND FINANCIALS

Worth Noting

The U.S. market for wireless data communications equipment and services reached $2 billion in 1993 and will grow to $15 billion by 2003, according to projections from International Resource Development, Inc., a research firm based in New Canaan, Conn.

People & Positions

SynOptics Communications, Inc. has announced that **Dennis Omanoff**, director of quality for the company, was reappointed by the National Institute of Standards and Technology to the Board of Examiners that will select the 1993 Malcolm Baldrige National Quality Award winners. The award is offered annually to U.S. companies that demonstrate quality management excellence.

Shareholders of **US West, Inc.** have elected or reelected six members to the board of directors. Elected to serve a two-year term on the board was **Richard Cheney**, senior fellow of the American Enterprise Institute and former Secretary of Defense. Elected to serve three-year terms were **Mary Gates**, regent of the University of Washington; **Pierson Grieve**, chairman of the board and chief executive officer of Ecolab, Inc.; **Allen Jacobson**, retired chairman and chief executive officer of 3M Co.; and **Richard McCormick**, chairman of the board and chief executive officer of US West. Elected to serve a one-year term was **Allan Gilmour**, vice chairman of Ford Motor Co.

Figures conflict on health of T-1 multiplexer market

Numbers from researchers, vendors vary widely.

By Jim Duffy
Senior Editor

Depending on who you talk to, sales of T-1 multiplexers last year were either robust enough to account for double-digit growth or soft enough to result in another year of single-digit growth.

According to data compiled by market tracker Dataquest, Inc. in San Jose, Calif., total U.S. revenue for 1992 was $469.6 million, up 12.8% from the $416.3 million posted for 1991 (see graphic, this page). The worldwide market was $965.3 million last year, which represents about 17% growth over 1991, the research firm said.

Traditional gear popular

Dataquest's figures, which represent sales of T-1 backbone and access muxes plus channel banks, suggest sales of traditional circuit switching gear are healthy despite the industry's evolution to packet switching technologies, such as frame relay and Asynchronous Transfer Mode (ATM).

"Users continue to add sites to their existing networks," said Dataquest analyst Joe Noel. "They're not ready to implement all of the new technologies, like ATM, [Switched Multimegabit Data Service] and frame relay. They're continuing to build their core backbone networks."

Vendors agree, but they believe Dataquest's figure for domestic growth is inflated. A more realistic growth rate is between 5% and 7%, they say, which indicates that the market remains as soft as in previous years.

Although modest, the 5% to 7% growth in the U.S. is attributable to several factors, according to vendors. As users rearchitect their networks, they may change their principal T-1 vendor, which means a new network sale to another supplier.

For example, J.P. Morgan & Co. recently replaced Ascom Timeplex, Inc. multiplexers with $5 million in Network Equipment Technologies, Inc. (NET) gear.

Taking the leap

Also, more users may now be able to justify the leap to T-1 and T-3 at more locations as bandwidth requirements continue to grow.

Ascom Timeplex last year won a $16 million deal with the Federal Reserve to install more than 100 of its muxes to upgrade the agency's 56K bit/sec funds transfer network.

Another factor in domestic growth is the increasing popularity of T-1 networks with smaller companies, vendors say. And large corporations are looking to tie remote office sites into the company backbone with access multiplexers.

Growth is also fueled by interest in frame relay as an overlay to existing circuit-switched backbones to handle bursty local-area network traffic. NET, for example, closed a substantial deal with brokerage firm PaineWebber, Inc. earlier this year to add frame relay to the firm's IDNX network.

Numbers game

Figures from Dataquest and T-1 vendors, however, differ dramatically from other research firms' tabulations. Vertical Systems Group in Dedham, Mass., for example, states that the domestic T-1 mux market grew by only 2.6% from 1991 to 1992. Revenue from U.S. sales of T-1 multiplexers in 1992 was $424.4 million compared to $413.7 million in 1991, according to Vertical Systems' figures.

"We didn't see any significant growth because the market is saturated and users have turned their [purchases] towards lower cost units for remote sites," said Rick Malone, principal of Vertical Systems.

Worldwide mux revenue for 1992, meanwhile, was $760.3 million compared to $735.4 million in 1991, the firm said, which represents a growth rate of 3.4%.

Though Vertical Systems' findings are not as exciting, vendors remain upbeat. The international market, for example, is still "growing like crazy," according to Dennis Tsu, director of strategic marketing at NET.

Tariffs internationally remain much higher than in the U.S., which continues to fuel demand for muxes to handle bandwidth management and network consolidation. Also, as in years past, most overseas countries still do not have installed base saturation like the U.S., vendors said.

U.S. T-1 mux market overview

Company	Millions of dollars in revenue		Percentage change	Market share	
	1991	1992		1991	1992
Ascom Timeplex, Inc.	92.0	100.0	8.7%	22.1	21.3
Network Equipment Technologies, Inc.	82.3	92.8	12.8%	19.8	19.8
Newbridge Networks, Inc.	61.6	73.0	18.5%	14.8	15.5
StrataCom, Inc.	22.0	35.0	59.1%	5.3	7.4
Telco Systems, Inc.	10.4	34.0	227%	2.5	7.2
Tellabs, Inc.	44.1	32.4	-26.5%	10.6	6.9
Racal-Datacom, Inc.	22.1	19.8	-10.4%	5.3	4.2
General DataComm, Inc.	27.5	18.9	-31.3%	6.6	4.0
Cray Communications*	12.9	10.5	-18.6%	3.1	2.3
Gandalf Systems Corp.	7.1	9.0	26.8%	1.7	1.9
Other	34.3	44.2	28.9%	8.2	9.5
Total	416.3	469.6	12.8%	100%	100%

*Figures for 1991 include Dowty Communications, Inc. sales.

GRAPHIC BY SUSAN J. CHAMPENY

SOURCE: DATAQUEST, INC., SAN JOSE, CALIF.

Internet's future lies in NSF solicitation

Four-part plan for next-generation Internet calls for Network Access Points and Routing Arbiter.

By Ellen Messmer
Senior Correspondent

WASHINGTON, D.C. — The National Science Foundation (NSF) recently issued its long-awaited solicitation for the next-generation Internet to replace today's backbone services with a more distributed network.

The NSF solicitation, planned as four separate projects (see graphic, page 33), includes the creation of Network Access Points (NAP) in at least three cities and the designation of a so-called Routing Arbiter to act as a routing coordinator for the Internet.

For more than five years, the Internet — a collection of over 10,000 interlinked networks — has largely relied on the federally funded national T-3 backbone services supplied by Advanced Network & Services, Inc. (ANS), under a subcontract from Merit, Inc.

But while the Internet backbone approach helped spur the explosion in Transmission Control Protocol/Internet Protocol-based connectivity, it also brought both policy and technical problems. Fearing that government subsidies to one provider would hurt other network providers, the federal government instituted the Internet's Acceptable Use Policy regarding data content.

Only data whose content type falls under the category of research and education is allowed on the Internet backbone; commercial business data is not. This policy, however, has generated confusion among users and dampened business interest in the Internet.

> The plan will largely get the government out of the Internet backbone business.
>
> ▲▲▲

When nonprofit ANS set up a for-profit subsidiary to serve commercial customers, the action generated heated debate over the fairness of letting the government-subsidized operation provide commercial services, even if services for research and education were not impacted.

The new network plan sketched out in the NSF solicitation last week will largely get the government out of the Internet

(continued on page 33)

Internet's future lies in NSF solicitation

continued from page 32

backbone business and help ease the problems associated with policy-based routing.

The T-3 backbone services will be phased out by next April in favor of a series of NAPs to which other networks — provided they operate at speeds of T-1 or higher — can attach.

NSF has not specified any architecture for NAPs but instead is inviting bidders that want to be NAP managers to propose ideas. The bidders must develop fee schedules for what networks will be charged for attachment to the NAP.

NAPs must support the switching of Connectionless Network Protocol and IP packets. The NSF said it expects route servers to use the IP-based Border Gateway Protocol and the Open Systems Interconnection-based Interdomain Routing Protocol.

Say OSI, but allow TCP/IP

Although the U.S. government mandates OSI in networks, the Internet is overwhelmingly TCP/IP-based. In the solicitation, the NSF has given itself an escape clause on the network protocol issue by stating that the requirements to OSI-based routing may be waived by NSF.

The inspiration for the NAPs stemmed from similar connection modes already used by the Commercial Internet Exchange (CIX) and the Federal Internet Exchange (FIX). The CIX network was created to let network providers exchange traffic directly without having to worry about violating the Acceptable Use Policy.

The next generation

Four elements, to be funded with a total of $18 million by the National Science Foundation (NSF), will form the basis for the next-generation Internet:

- One or more Network Access Point (NAP) managers
- A Routing Arbiter organization
- A very high-speed backbone network service provider
- Regional networks to provide interregional connectivity by linking to NAPs and network service providers

The NSF hopes to select winning bidders this winter in order to phase in the cutover from T-3 services provided by Advanced Network & Services, Inc. next April.

SOURCE: THE NATIONAL SCIENCE FOUNDATION, WASHINGTON, D.C.
GRAPHIC BY SUSAN J. CHAMPENY

Steve Wolff, director of networking at NSF, said the agency will rely on a panel composed of user and industry representatives to review NAP suggestions.

"No bidders will be on the panel," Wolff said. In addition, the government is encouraging industry to build non-funded NAPs at their own discretion in order to encourage competition and privatization of NAP services.

An entirely new element introduced in the NSF solicitation is the Routing Arbiter, a job that will fall to an organization chosen to handle a number of routing tasks that formerly were part and parcel of the role of backbone provider. In fact, the solicitation warns that the Routing Arbiter and the 155M bit/sec backbone provider cannot be the same organization.

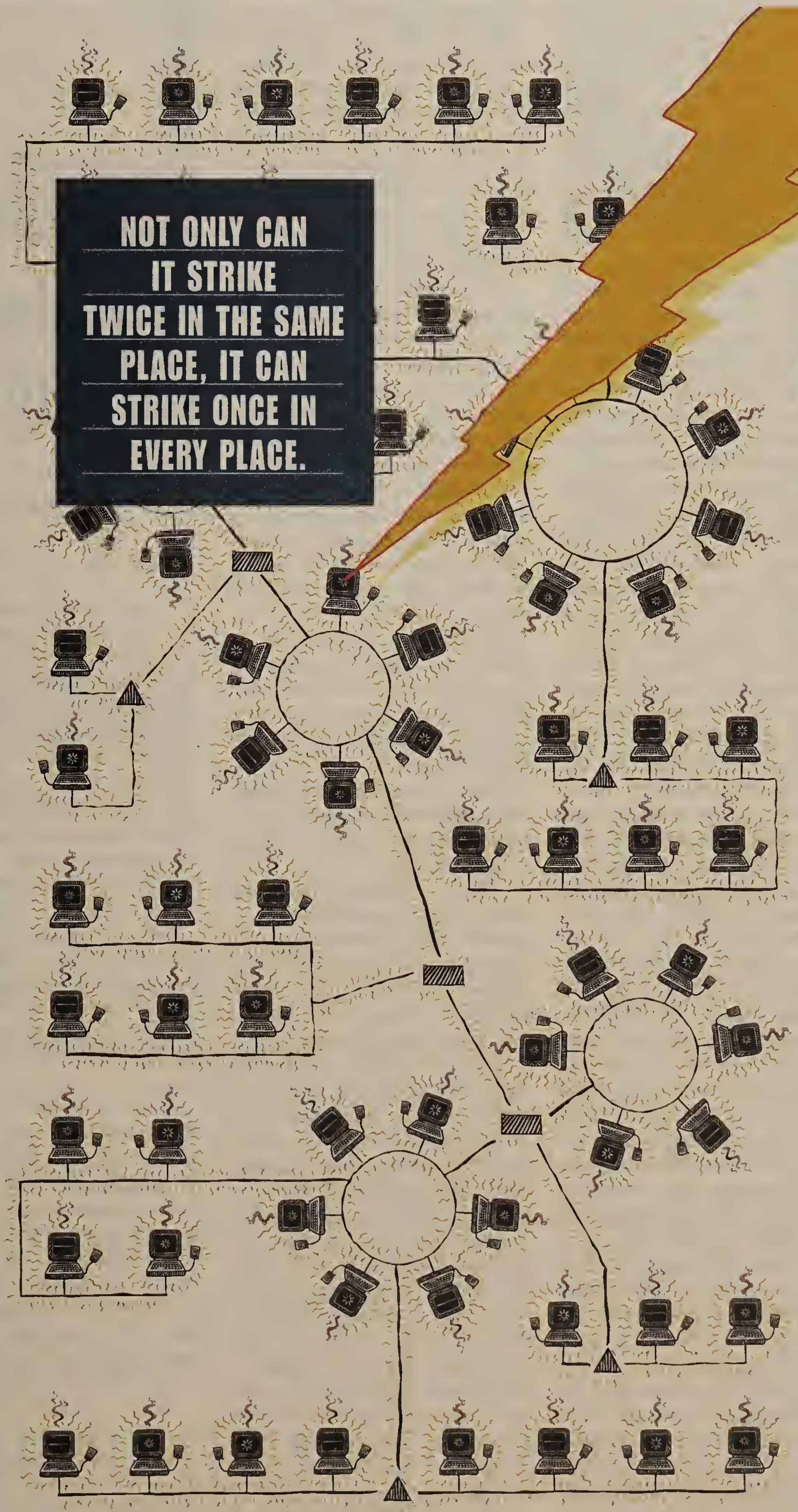
The Routing Arbiter will maintain routing databases of routing services that networks attached to the NAPs or 155M bit/sec backbone access points can use to obtain information on network topology, policy and interconnection information in order to construct routing tables.

"This component of the architecture will provide for an unbiased routing scheme which will be available [but not mandatory] for all attached networks," the solicitation states.

To ease the transition for the regional network providers that use the ANS T-3 services, NSF plans to distribute federal largesse to those that bid on the solicitation as well. An undesignated portion of the $18 million NSF has available for the upgrade will go to the regionals to pay for attachments to a network service provider, such as any local or long-distance carrier with TCP/IP or OSI support that can get to an NAP, or for direct connection to an NAP.

It is hard to imagine how only $18 million could buy everything NSF would like, but the agency is clearly counting on the force of competition and the privatization of Internet services to attract industry interest in the burgeoning market of Internet services now used by millions of people around the world.

Although it is dismantling the current Internet backbone, NSF plans to pick a company to supply a 155M bit/sec backbone to link six NSF supercomputer centers. The project is being undertaken to spur the development of high-speed networking as outlined in former Sen. Al Gore's 1991 bill to develop the National Research and Education Network. ☐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MANAGING PEOPLE AND TECHNOLOGY: USER GROUPS AND ASSOCIATIONS

Worth Noting

"How do we reduce the labor cost? How do we translate that into more productivity? How do we achieve more uptime and less disruptions? Those are the key questions for net managers."

John McConnell
Vice president
Infonetics Research, Inc.
Boulder, Colo.

Manager Minutes

American Management Systems and the **Graduate School of Industrial Administration of Carnegie Mellon University** are accepting nominations for the Sixth Awards for Achievement in Managing Information Technology. The awards recognize senior executives and professionals who have made outstanding contributions to their organizations and industries through the use of information technology.

For further information, contact Jan Dodson, American Management Systems, 1777 North Kent St., Arlington, Va. 22209.

Sixty-three percent of the California companies surveyed by the management consulting firm of **Arthur D. Little** have increased their 1993 information systems (IS) budgets by an average of 15%.

According to Walter Ulrich, Arthur D. Little Pacific Southwest director, this trend is a reversal from last year when over half of the companies surveyed reported spending less on data processing and IS than they had the previous year. ◻

Motorola looks to farm out voice, data networks

Hopes to cut net costs while boosting quality.

By Michael Cooney
and Maureen Molloy
Network World Staff

SCHAUMBURG, Ill. — In what could be one of the biggest outsourcing deals in history, electronics giant Motorola, Inc. intends to outsource its voice and data networks in an effort to boost productivity while simultaneously trimming net costs.

The company handed out its network outsourcing requirements in a request for proposal at a meeting held here last month, which was attended by at least two dozen of the top outsourcing firms and carriers in the country.

According to Les Shroyer, Motorola's former chief information officer and newly appointed vice president and director of the company's network products divison, the deal involves outsourcing network operations, including a Systems Network Architecture net, domestic voice network and a peer-to-peer internetwork. Shroyer declined to put a price tag on the deal, but other sources said it would be well into the millions of dollars.

The firm will consider outsourcing all or part of this environment and may use multiple vendors. The company expects to begin the project by year end, Shroyer said.

Today, Motorola has a private, enterprisewide network that interconnects more than 70,000 computers and supports more than a 1G byte of data transactions monthly, with that traffic volume growing by more than 20% per month. The company's net engineers have been pioneers in the deployment of frame relay, fast packet and local-area net internetworking technologies. Last year, it also led most users when it took up the challenge of folding its SNA traffic onto its worldwide peer-to-peer internet (*NW*, Jan. 20, 1992, page 2).

"We feel we have some of the best in-house expertise, and we're proud of the net we've built over the years," Shroyer said.

But the company nonetheless began looking to outsource its net operations several months ago in an effort to help it achieve two primary and highly ambitious goals: slash net operations costs while boosting productivity and product quality.

Motorola has carefully audited its own operations to determine exact costs for services and has set specific parameters for performance. To win Motorola's business, the bidding vendors must meet or beat the company's performance standards, and at a lower cost than Motorola is currently paying.

The company, a 1988 recipient of the U.S. Department of Commerce's Malcolm Baldrige National Quality Award, is aiming to reduce the defects in everything it does, from manufacturing to service.

Today, defects fall in the parts per million range.. Motorola wants to bring that down to the parts per billion range. For networking, that means trimming circuit outages from minutes per year to subseconds.

In addition, the company is looking to reduce its production cycles by a factor of 10 during the next five years, thereby speeding up its time-to-market period and reducing costs.

Shroyer said he is optimistic that outsourcing will provide the same or better quality service as in-house staff.

"We've already achieved some significant capabilities on our own, but are now leaving our options open as we continue to evolve," he said. "We're now looking for strong partners who can [run the net] even better."

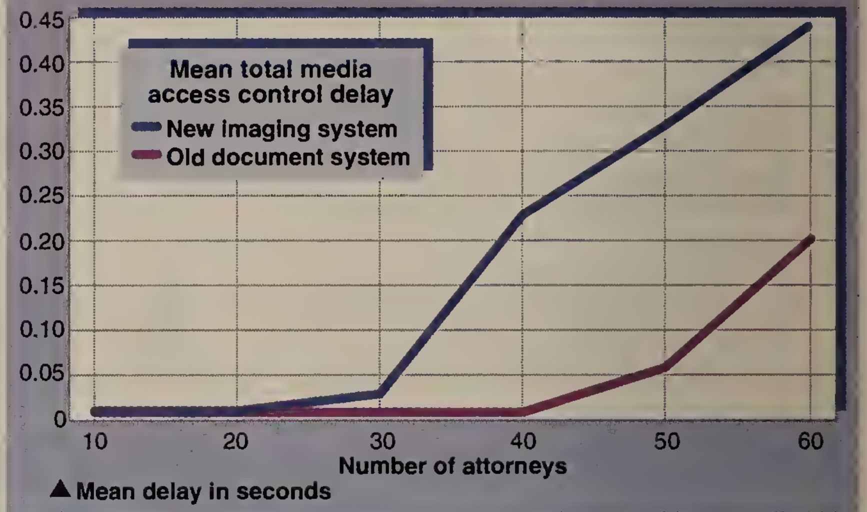
Analysts said the possibility of Motorola outsourcing its net operation is a watershed event.

"This isn't a company struggling financially or having a hard time running its networks," one source said. "It is looking for the best possible way to run its network — and if third parties are the answer, Motorola will do it."

Howard Anderson, managing director of The Yankee Group consultancy in Boston and author of Motorola's RFP, said this could be the start of a "second wave" of outsourcing deals — with well-managed companies leading the charge.

"Motorola's willingness to consider outsourcing reflects the idea that its network can be operated in an equal or superior manner by third parties than it is today," Anderson said. ◻

MAC message delays on office ring
Figure 1



GRAPHIC BY SUSAN SLATER

SOURCE: NETWORK PERFORMANCE CORP., DUNKIRK, MD.

Simulating your way through net changes

Hypothetical case study shows how simulation tools help managers plan for network upgrade.

Second in a two-part series.

By Andrew Jazwinski
and Brian Laszakovits
Special to Network World

In the first part of this article, we examined the issues involved in using simulation in network analysis. This piece shows how simulation can be applied by detailing a case study involving network segmentation and backbone design using Comdisco Systems, Inc.'s BONeS PlanNet simulator.

Our case study will focus on Total Financial, a hypothetical, growing legal and financial services company that provides such services as financial planning assistance and investment guidance.

Total Financial's current network consists of two 4M bit/sec token rings connected by an IBM PC Bridge. The office ring supports 68 administrative users, 34 financial analysts and two Novell, Inc. NetWare 3.11 servers. One server offers word processing and electronic mail services to all users, while the other supports a financial spreadsheet application for the financial analysts.

The second token ring, the legal ring, supports 34 attorneys. In addition to word processing and E-mail services, the attorneys can access a document retrieval database, which is kept on a local NetWare 3.11 server.

Total Financial has ordered an image software package to replace the document retrieval database. With this package, administrative staff will scan in and store legal and financial documents on the new NetWare 3.11 image server, enabling the attorneys to retrieve images from that server.

With 136 total current users and significant projected growth during the next year, there is little room for additional network traffic, and with an imaging application added, traffic levels will probably increase. Total Financial wants to do some planning now to avoid surprises later.

Planning the project

Total Financial will use PlanNet during the planning process to perform three major tasks: model and simulate the current network environment; add imaging to the model and run simulations to identify any negative effects on the network; and evaluate any reconfiguration suggested by results of the simulation.

Simulating the current net provides an accurate baseline for simulating the network with the imaging application added, as well as any network reconfigurations.

Total Financial has observed that there is a rough ratio between the number of attorneys, financial analysts and administrative staff it employs. This ratio is about 1-to-1-to-2. We will use this information in our simulation for scaling the number of

(continued on page 35)

Simulating through net changes

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network nodes.

PlanNet allows us to define the number of financial analysts and administrative staffers in terms of the number of attorneys in the organization. So when we vary the number of attorneys, we will be varying the whole staff along these ratios.

Data collection

Information about the network topology, devices connected to the network and the traffic on the network must be collected before the network can be accurately modeled. A physical audit of the network, collection of user profiles and traffic traces for modeling the protocols and applications should turn up the necessary data.

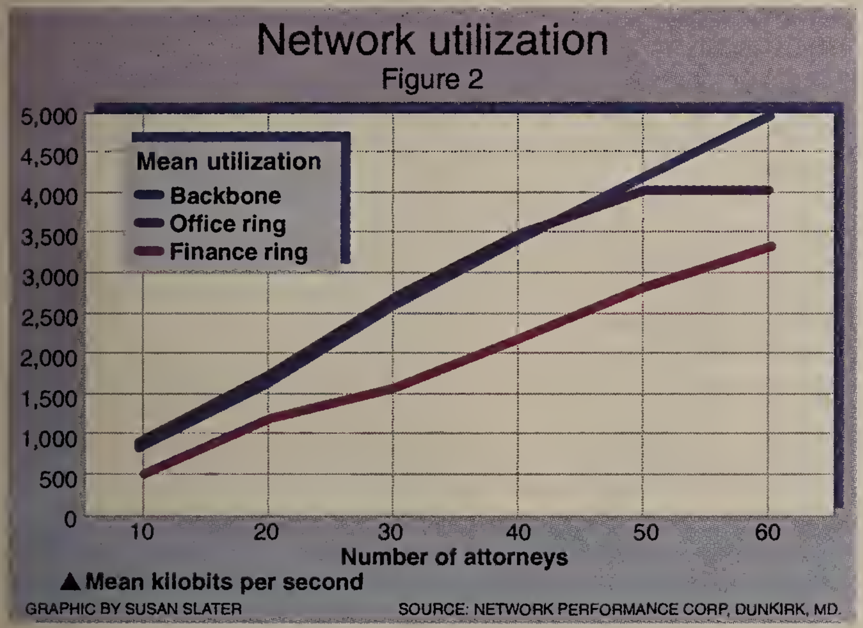

Network utilization

Figure 2

GRAPHIC BY SUSAN SLATER SOURCE: NETWORK PERFORMANCE CORP, DUNKIRK, MD.

As with most network simulators, PlanNet's segment modules represent the local-area network through the network layer. Transport and higher layers can be modeled in PlanNet using application scripts, which run in PlanNet's Application Traffic Generator.

Total Financial elected to build these PlanNet scripts to model their network traffic. The company must describe its applications: how they are used (for example, if they are distributed or downloaded from the server), how frequently they are used, and the typical file, document and record sizes.

Application scripts were then built for the applications — word processing, E-mail, spreadsheet and document retrieval, as well as the new imaging program — running on the company's NetWare 3.11 Internetwork Packet Exchange/NetWare Core Protocol (IPX/NCP) stack.

It should be noted that application scripts let users describe the client/server interaction in terms of communications as well as disk and CPU utilization.

Finally, it was decided to plan for the "busy period" on the network, typically the 15 to 20 minute period at the start of a workday. Based on the application usage information, simple application scripts suitable for network segmentation analyses were developed and validated against detailed models of the applications.

The current network, consisting of the two rings, was simulated first. This network runs the old document retrieval software on the legal ring.

The number of financial analysts was set equal to the number of attorneys, and the number of administration staffers was set to be double the number of attorneys. Then the parameter for the number of attorneys was varied over a range of 10 to 60.

Our simulations, examining media access control (MAC) layer packet delays (*NW* graphic, May 17, page 33), showed the office ring is almost at capacity with the current 34 attorneys (102 users on this ring). We are almost at the knee of the delay curve, and would not recommend more than 40 attorneys be put on the current system.

Given that the new imaging system is expected to require significant additional bandwidth, we cannot really expect the current architecture to support it.

Adding imaging

We now compare the current Total Financial network with a hypothetical network having the same system architecture but with document retrieval replaced by the proposed imaging system.

Instead of retrieving 125K-byte documents, the attorneys now retrieve 1.5M-byte images on the average of every five minutes during busy periods. In addition, administrators scan and store images on the average rate of one every 10 minutes. The imaging software resides on the client machines and does not have to be downloaded from the image server. As was mentioned before, these activity rates apply to a network's busy period.

Figure 1 compares MAC delays on the office ring for the old document system and the new imaging system. It is clear the current network will not support the new imaging software.

The office ring is saturated at about 30 attorneys (90 users on the office ring) and will not support even the current 34 attorneys, let alone accommodate growth. Analysis shows that the current architecture can support only about 25 attorneys (100 total users) when the new imaging system is added. A network redesign or reconfiguration is clearly required.

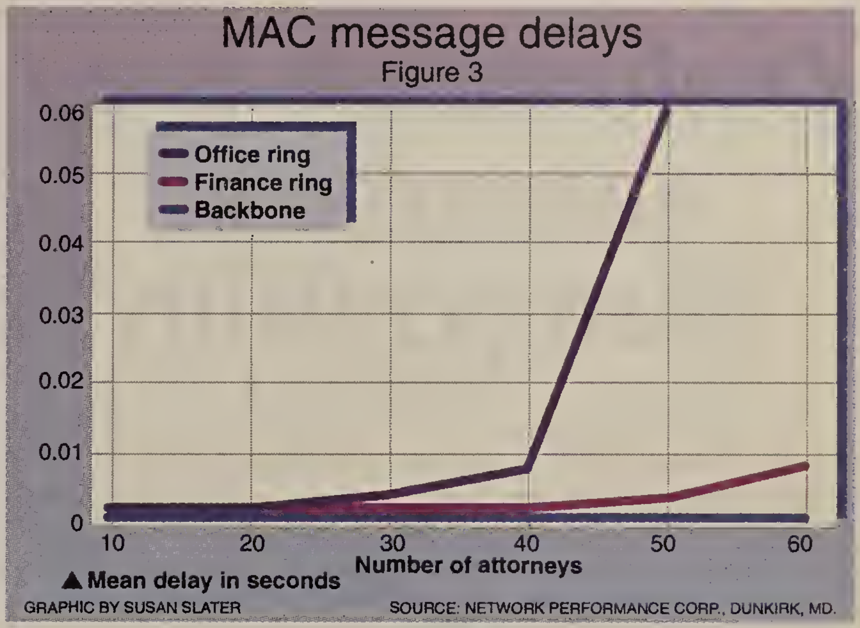

MAC message delays

Figure 3

GRAPHIC BY SUSAN SLATER SOURCE: NETWORK PERFORMANCE CORP., DUNKIRK, MD.

To provide adequate bandwidth for the imaging system, while allowing for future growth, we propose to install a 16M bit/sec token-ring backbone to integrate the current 4M bit/sec rings.

Both the image and office servers are attached to the backbone. The financial server is left on the original 4M bit/sec ring, which is now the finance ring, to help localize traffic. And the attorneys are attached to the backbone ring for the same reason.

A temporary, working image server is provided on the office ring to temporarily store scanned images. This is merely working storage, and each evening the scanned images are transferred to the image server on the backbone. Since this occurs when the offices are closed, the bulk image transfer to the image server is not included in the simulation of the busy period.

Simulated performance results for the proposed architecture are shown in Figures 2 and 3 on this page.

These results indicate that the proposed system will support about 40 attorneys (160 users). And the proposed solution is scalable since the backbone can easily support the addition of more 4M bit/sec office rings to support growth beyond 160 total users.

It should be noted that the Total Financial case study deals only with segmentation and backbone design issues and does not address the image server at all. Simulation can also be used to size the server and analyze its capacity, as described in the first part of this article. ◘

Jazwinski is president and Laszakovits is a consulting network engineer with Network Performance Corporation (NPC). NPC, located in Dunkirk, Md., provides network design consulting services using state-of-the-art design simulation tools. NPC may be reached at (301) 855-4600.

Sybase to reignite tool biz

continued from page 29

Strelau hopes GainMomentum tools will seduce what he referred to as "elective users" — users that do not necessarily require a network-based application to get the job done — by making applications more intuitive with "information-rich user interfaces."

He said elective users include high-level executives as well as trading partners, which may be more receptive to highly graphical applications than conventional batch processing electronic data interchange applications, for example.

GainMomentum tools had largely been used for building stand-alone applications before Sybase purchased Gain Technology. Since then, Sybase and Gain Technology have teamed up to provide preprogrammed links to assorted back-end databases, said Bob Runge, Sybase's manager of products for GainMomentum.

A new version of the software will be unveiled as part of the firm's broad tool announcement next month.

Object-oriented slant

GainMomentum tools use object-oriented technology to store complex data, such as video, that can make an application more intuitive, according to Runge. Video clips can be stored across multiple clients on a net instead of on a centralized database server for improved performance, he said. Many database vendors are moving to support video and other complex data types at the server via object technology but, in doing so, may be stretching network resources too thin.

Liz Barnett, vice president of advanced software development at New Science Associates, a Westport, Conn., consultancy, said Sybase currently is not known for its tools, but if any company can leapfrog the competition, it is Sybase. ◘

Firms bolstering products

continued from page 29

Commence 2.0 costs $395 per copy, with discounts for volume purchases. A 10-user pack, for example, costs $1,995.

Adding a new twist to group schedulers, Raindrop Software Corp. of Richardson, Texas, has introduced an Object Linking and Embedding (OLE)-based personal and work group calendaring program, called Epoch 1.0, that runs on NetWare, Windows for Workgroups and other LANs that support Windows clients.

Support for OLE enables users to access working documents, such as a spreadsheet or word processor, from within Epoch. Conversely, users can access Epoch from within any OLE-compliant Windows program.

OLE support makes Epoch ideal for managing projects, according to Raindrop President John Jeffus. For example, a team of users can store all documents related to a project within the To-Do list of Epoch, making it easy for users to find and access all documents, applications and assignments pertaining to the project.

Epoch stores all data in a central database and uses proprietary E-mail to notify users of changes. It also supports Microsoft Mail, Workgroup for Windows and MHS mail.

Available now, Epoch costs $129 for a one-user version.

DEC: (603) 881-6150; Powercore International: (800) 237-4754, Ext. 109; Jensen-Jones: (903) 530-4666; Raindrop: (214) 234-2611. ◘

OPINIONS

STANDARDS SCENE

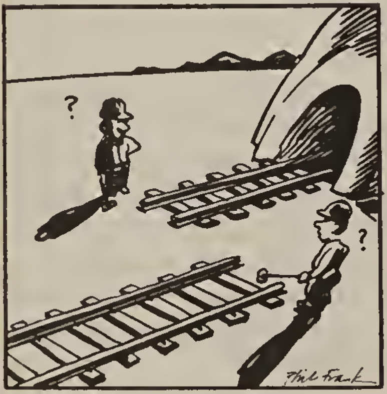
BY WILLIAM STALLINGS

Conformance is no guarantee of interoperability

Although the Open Systems Interconnection model has been an international standard for more than a decade, OSI implementations have been slow to arrive at market. Also, some OSI proponents are promoting conformance standards to speed up the process. But users should be aware that conformance does not guarantee interoperability, which is the real key to developing practical OSI-based implementations.

Conformance standards provide a methodology for ensuring that a vendor implementation of a given application or utility conforms to a certain set of specifications. The International Standards Organization has been developing conformance standards and another family of standards, called International Standardized Profiles (ISP), to address two problems with current OSI standards.

The first issue is that OSI protocol specifications are prose descriptions that do not lend themselves to mathematical proof. Therefore, some degree of human judgment is needed to determine what a specification actually entails. The resulting ambiguity can prevent two implementations from interoperating.



The second problem is that OSI standards typically contain a number of options and parameters with undefined values so that a single protocol can be used in a number of applications that have similar but not identical protocol requirements.

Unfortunately, this means that if two vendor implementations use different options and parameters, they may not be able to interoperate.

Conformance standards and ISPs work together to address these problems. The ISPs specify the protocols required for given applications, as well as the required options and allowable parameter value ranges for each protocol. Conformance tests are then defined for all the protocols, options and parameter value ranges defined in the ISP.

This approach enables a vendor to demonstrate that its implementation conforms to the standards for the set of protocols required to support a particular application. However, users still need to be wary — two different vendor implementations may meet the conformance standards and still not be interoperable.

Even interoperability demonstrations, often made at trade shows such as INTEROP, don't ensure total interoperability. For example, while Vendor A's product may interoperate with Vendor B's, and B's with C's, there is no guarantee that Vendor A will interoperate with C.

The whole problem is more complex than most people originally thought it would be when OSI was a theoretical concept and not the framework for real products. The best strategy for users is to look for proof of conformance and interoperability, and keep their level of skepticism high.

Stallings is an independent consultant. His latest book is Networking Standards: A Guide to OSI, ISDN, LAN, and MAN Standards, *published by Addison-Wesley. He can be reached by E-mail at 72500.3562@compuserve.com.*

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EDITORIAL

If a mainframe falls in the forest, does it make a noise?

A number of trees have given their lives lately as pundits and the press debate the question, Is the mainframe dead?

The issue is of big concern at IBM these days, and it makes for great philosophical discussions at cocktail receptions and on editorial pages. It has become the computer industry equivalent of the classic metaphysical question: If a tree falls in the forest and no one is around to hear it, does it make any sound?

How particular pundits answer the mainframe question speaks more of their vested interests in the issue than a real concern for users' needs.

For the micro-centric, the mainframe is a dinosaur whose bones are buried under the sands of history. The glasshouse apologists posit an ongoing role for the "big iron" that smaller systems will never usurp and chuckle that the start-ups are only now beginning to understand the challenges in running business-critical applications.

Interestingly, we rarely hear readers getting caught up in the debate — largely because it has little relevance in their day-to-day lives. Mainframes exist, as do minicomputers. Ditto for local-area networks and personal computers. The trick is tying them together to serve business means. Users have shifted applications development off the host in a big way. But the fact remains that they've got a substantial cache of data and a variety of applications on the big iron that end users need to access.

Smart users have developed strategies that allow them to integrate existing technologies — in which they've invested billions over past years — with new tools that can help them meet their goals.

All this bantering over the "death" of the mainframe would be amusing if it didn't hold the potential to foment discord among information services professionals with differing skills and experience. Given the magnitude of the technology integration challenges facing corporate America, that's counterproductive.

All the trees expended on the great mainframe debate would be better devoted to practical advice for helping users pull off that integration challenge.

LETTERS

Deja vu once again

I enjoyed Ellen Messmer's article regarding the Clipper Chip (April 19, page 1).

The attitude of the government, which insists on being able to "read other people's mail," is not new. In the 1970s, when the Data Encryption Standard was being worked on, the National Security Agency complained because the proposed system would be so good that it would take weeks for their computers to crack the code. They decreed that the 128-bit algorithm be replaced with a simpler 64-bit one to make it easier for them to decode traffic.

Bob Roehrig
Technical support coordinator
Aurora University
Aurora, Ill.

Nip Chip in the bud

The Clipper Chip proposal is seemingly the first step in the government's attempt to gain additional control over its people.

The administration says the Clipper Chip is needed to catch criminals. But why would criminals use a technology that would allow them to be monitored when relatively unbreakable encryption systems are now available? They wouldn't, unless the Clipper Chip was the only technology available. So we see what must be the government's long-run intention: to make Clipper Chip the only permissible way to provide encryption.

The government has been developing this technology in secret meetings and refuses to reveal the algorithm or its design objectives. We need a national debate about the implications of such a technology, not back room deals among government spooks.

I advise users to write to their government representatives and tell them you object to these Big Brother military control tactics and you want encryption systems that respond to your true needs.

Charles Cresson Wood
Independent information security consultant
Sausalito, Calif.

Not the user's job

In your special issue on "Securing the Enterprise Network," David Stang suggests that users make frequent backups (April 12, page 50). I suggest that *the system* do the work. Those of us with mainframe experience know that automated archival and library management are "givens" in that environment.

Centralized, automated backups should be performed, all right. It's just a question of what's doing it — not who.

Lynne Gregg
Independent consultant
Seattle

Off base on Internet

David Ferris' column "Setting up an Internet connection" (March 22, page 27) contains errors and will go far to discourage people from using the Internet.

First, Internet file copying is not limited to mail-based file copying. With the File Transfer Protocol (FTP) and related services, users have access to remote files and directories.

Second, Ferris claims that "Most computer people don't understand TCP/IP." Just about anyone — technically oriented or not — can be shown how to use a Transmission Control Protocol/Internet Protocol network in a few minutes.

Third, he states "Internet mail messages can sometimes take a very long time to arrive." Most of my electronic mail messages get delivered in less than a minute, from Maryland to California, as well as from Maryland to the U.K. Yes, occasionally mail is lost or delayed, but very infrequently.

Fourth, Ferris questions the Internet's reliability. TCP/IP has built-in reliability. Worrying about the paths your packets might take over the Internet is like worrying about the paths your voice signal takes over the telephone system.

The Internet is a powerful and useful tool. I had hoped to read an article that encouraged its use. Instead, I was disappointed to read an article loaded with misinformation and false concerns.

Frederick Avolio
Principal analyst
Trusted Information Systems, Inc.
Glenwood, Md.

Author's response: Your point regarding FTP is valid. My original version of the column mentioned FTP; unfortunately, this reference was deleted in the editing process.

Regarding TCP/IP, I stand by my comments. Only one person in 100 fully understands the TCP/IP stack today. If this is different at your company, it is not a typical company.

Regarding delivery of mail, I agree in most cases that it takes less than a minute, but it can easily take five days. This has happened to me, for example, when communicating via Compuserve to Internet users on The Well.

Regarding reliability, I agree that the TCP/IP stack as such is reliable. However, when you send data over the Internet, you can't be sure that a subnetwork along the way is going to be up. If you're running electronic data exchange or some important application over the Internet, you need to know this.

You seem to think that I don't like the Internet, but that's not the case. I think the Internet is very important and is going to become a mainstream technology. In no way did I intend to discourage its use.

Signatures clarified

In his letter to the editor on electronic signatures (April 12, page 41), Craig Paul appears to be confused on two points.

The purpose of an electronic signature is to assure the recipient that the entity signing the transmission actually originated it. The electronic signature is not designed to stop John Doe from sending a transmission (including one that was originally sent by the U.S. Department of the Treasury) and signing it "John Doe." The goal is to prevent John Doe from originating a transmission (such as "Transfer $1 million to John Doe") and signing it "U.S. Treasury."

To prevent reusing a valid signature on another transmission, the signature is made a function of the message contents using the hashing procedure described in Ellen Messmer's article on page 48 of the same issue. Therefore, if only the signature function is needed, the entire message doesn't have to be encrypted.

Walt Roehr
Executive director
Telecommunications Networks Consulting
Reston, Va.

LAN shoot-out II

In his article "Apple, Novell plan port of Mac-like OS to PC platform" (April 26, page 6), Fredric Paul states "The upcoming Windows NT presents a clear challenge to Novell's new NetWare 4.0 network operating system." This invokes memories of Microsoft Corp. LAN Manager vs. NetWare, where Microsoft proponents claimed that LAN Manager would spell the demise of Novell's dominance.

For most DOS/Windows users, LAN Manager was more like MS-NET revisited. Similarly, unless it has undergone an extensive overhaul, the network server features of NT are little more than LAN Manager revisited.

Microsoft should abandon LAN Damager and its wimpy, nonroutable, network-limiting Network Basic I/O System protocol in favor of providing better support for real protocols like Novell's NetWare Integrated Packet Exchange (IPX) and the Transmission Control Protocol/Internet Protocol.

Buddy Shipley
President
Shipley Consulting International
Silver Spring, Md.

Expertise in action

In the article on the disbanding of the Network Reliability Council (NRC) (April 19, page 4), Brian Moir of the International Communications Association displays a disturbing lack of understanding about the broad-based industry involvement in the mission and accomplishments of the Exchange Carrier Standards Association (ECSA).

More than 2,000 people from 300 telecommunications companies participate in the committees we sponsor. The committees are open to anyone with an interest in hard work and consensus-based problem solving.

Due to our committee's expertise, the NRC asked the ECSA to continue the analysis of network outages. The industry steering committee appointed by the NRC will oversee the ECSA's analysis and make recommendations if negative trends become evident.

George Edwards
President
ECSA
Washington, D.C.

Not a secret agent

Your Buyer's Guide to intelligent wiring hubs (March 8, page 49) states "Almost all hub vendors provide SNMP agents that relay information about the hub chassis . . . Some exceptions to this include DEC . . . which only [provides] agents for [its] hub modules."

The DECagent 90 is a proxy agent for some of the modules in the DEChub 90, but it also keeps a slot table so users can see which modules are in which slots. This is the only hub Management Information Base (MIB) information that exists in this hub. Our next hub will implement much more of the hub MIB since there will be more of that type of information to manage.

Bill Seaver
HubWatch marketing manager
Digital Equipment Corp.
Maynard, Mass.

TELETOONS

BY FRANK AND TROISE

SERGEANT RALPH
COMBAT NETWORKER
ALL OUR SERVERS HAVE CRASHED. COVER ME! I'M GOING IN!
RALPH... DON'T BE CRAZY! IT'S CRAWLING WITH USERS DOWN THERE!

If you were linking 100 years of tradition with the next century, which premises wiring system would you spec?

University of Rhode Island chose AMP.

Founded at Kingston in 1892, University of Rhode Island carries a strong tradition of looking forward – including being among the first four Sea Grant colleges in the nation.

NETCONNECT Patch Panels bring maximum flexibility for the future to University of Rhode Island's advanced wiring specification.

AMP and NETCONNECT are trademarks.

No surprise, then, that when they reviewed their networking environment five years ago, they set their sights firmly on the next century.

Today, URI runs TCP/IP Ethernet on an FDDI-ready, campus-wide fiber backbone. Remote campuses are linked in, and the school is seeing its plan take shape. Key in that plan is a premises wiring system from AMP — the NETCONNECT Open Wiring System.

To provide cabling with a future, the University specifies horizontal wiring that includes two Level 5 UTP cables for data and one Level 3 UTP cable for voice at each station. And, with an eye on emerging technologies such as ATM, the current spec asks for a two-pair STP cable in the mix.

At the user end, wiring is terminated permanently to four-port AMP Communications Outlets, where changes can be accomplished with a simple insert exchange. Inserts match equipment to the installed cable, and provide the correct connector. Just as importantly for URI, the inserts provide an upgrade path to higher-performance Category 5 levels.

Where room allows, wiring at the closet goes to matching outlets in patch panels. In tight spots, NETCONNECT 110Connect panels are used, with punch-down termination on the back and a printed circuit board interface to RJ45 connectors up front. The pcb interface guarantees consistent impedance and crosstalk control, required by newer technologies.

Their wiring specification gives URI maximum room to grow, and their AMP NETCONNECT system gives them the ability to take maximum advantage of that wiring, now and in the future.

For more information about the AMP NETCONNECT Open Wiring System, call 1-800-522-6752 (fax 717-986-7575). AMP Incorporated, Harrisburg, PA 17105-3608. In Canada, call 416-475-6222.

THIS IS AMP TODAY. **AMP**

Circle Reader Service #13

CLIENT/SERVER MIGRATION

Taking the first step

By STEPHEN BASILE

Ask any MIS or network manager why so many companies are pushing to rightsize host applications and they'll likely point to anticipated cost savings as the main attraction.

The reality, though, is that initial efforts to deploy client/server applications on open systems in distributed nets may actually increase costs. As with other return-on-investment analyses, there can be no return without an initial investment, and that investment can be significant for firms just beginning to toddle tentatively down the path toward client/server nirvana. The steps taken may appear small at first but, when properly guided, can cover a lot of ground.

In light of this, developing a plan to determine which applications are likely candidates for the initial move to a client/server architecture is critical. Failures, especially at the earliest stages of a client/server project, can spell the end of further application migration. The credibility of the technology leader or net manager driving the move can suffer if projects are late, over budget or do not gain user acceptance.

Planning and careful assessment of the level of distributed computing expertise is also critical for a client/server migration project. Initially, net managers have to take into account higher administration and personnel costs, especially in an organization lacking distributed computing experience and related administration skills.

The term "client/server" refers to a computing architecture that distributes portions of applications across a network to multiple computing resources. Consequently, its impact extends beyond application design to the network itself. Regardless of the networking technologies used, it's crucial for network managers involved in client/server application migration to evaluate the current health of their networks, with a critical eye toward available bandwidth.

Managers can use net performance monitors, analysis tools and software programs or the services of a third-party network performance consultant to evaluate current network utilization, error rates and topology. A network that barely satisfies user demand today will buckle quickly under the weight of new client/server applications.

Because client/server computing implies a logical, networked distribution of functions and a message-passing, concurrent event approach to program-to-program communications, the underlying net becomes more than a simple data pipeline. Instead, it evolves into an integral part of the overall information systems (IS) infrastructure.

It's easy to anticipate the immediate concern of network managers as this new approach to computing proliferates: What is all this stuff going to do to my network? Net managers may be rightly concerned over the impact of emerging client/server applications on available network bandwidth if they have not had much experience in the past with these types of applications. It's quite logical to conclude that "all that stuff" — a graphical user interface, its window events (signals sent via the network to indicate that a client window has been moved, reshaped, covered or uncovered), multiple screen updates and so forth — going on at the client level is likely to result in a significant increase in network traffic.

Forward-thinking network managers may also be looking beyond the local-area network to fully distributed client/server applications and wondering about the suitability of existing wide-area links for the increased traffic. High-speed digital services are more readily accessible than ever and at significantly lower costs.

Putting together all the pieces of a downsizing effort can initially be a monumental task.

The cost-justification point for higher speed digital services is now much lower, so network managers should consider replacing low-speed analog or digital lines previously used for terminal traffic with new lines suited for increased local-area network and client/server volume.

Asynchronous Transfer Mode (ATM) is attracting a lot of attention as a possible solution for those concerned about net bandwidth, as well as those looking for a more reliable, higher speed broadband networking solution.

With minimum speeds likely to be in the 45M bit/sec range (T-3) and theoretical maximums exceeding 2.5G bit/sec, ATM appears poised to become the enabling technology for true distributed computing. Indeed, with the emerging penetration of multimedia applications, as well as client/server applications requiring extensive graphical data to be displayed on client screens, ATM would seem ideally suited to these bandwidth-hungry applications just now beginning to emerge.

Also, its inherent flexibility and growth potential would appear to provide a useful hedge against network obsolescence for net managers faced with rapidly increasing network demand.

Application choices

It's tempting for network managers to look at the old warhorses of their application base, searching for those routines tied to obsolete hardware or obsolete procedures in a quest to find the best candidate for migration. These golden oldie applications may have significant response time problems, be based on "spaghetti code" without proper documentation, or simply be clamoring for an update or revision.

Others may target applications that are likely to deliver some demonstrable competitive advantage, perhaps through improved accessibility of data, better response time or improved data formatting and customized reporting. Still others will try to migrate only simple, clearly defined applications that seem like a sure thing at first.

The advice "find something that's broke and fix it" applies well here. An old application in need of revision may indeed be a likely candidate for migration to an open systems-based client/server environment, but only if that application relies on data structures that can be readily divided into logical functional units that are well-suited for distributed computing.

In legacy systems, programs are rarely islands, but rather usually part of a series of interconnected chains of data. Many applications may rely on several diverse data sets residing on a host or update other databases used by seemingly unrelated applications. It's important to avoid, at least at first, those deeply intertwined applications because of the difficulty of cleanly defining the client and server components of such nested applications.

A careful look at the backlog of customer service requests or application modification requests may yield an application or two well-suited to a client/server architecture. Applications that have been long underutilized due to poor response, inflexible reporting or obsolete information may deliver the early win necessary to encourage further client/server development and deployment. Rewriting either a flawed application or one that is scheduled for rework or revision can often yield rapid benefits in a client/server arena.

❖ ❖ ❖

On average, companies spend $1.7 million for their first high-end client/server application.

❖ ❖ ❖

Applications closely tied to the bottom line or those on which critical competitive decisions

(continued on page 44)

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Client/server chaos yields valuable lessons

By JEFFREY NICKERSON

Examining the mistakes others make moving to client/server computing lets users steer clear of the same pitfalls.

In the brave new world of client/server environments, net managers are forever being paged.

While there is little doubt that client/server computing empowers end users, the complexity of these networks can prove enigmatic for network personnel who must locate and remedy net mishaps.

In some cases, these technical crises are closely bound to the specifics of the networking environments in which they occur. Yet, in many instances, there are valuable lessons to be learned from the common problems others have faced and overcome in the constant quest for reliability. While many users aren't willing to publicly own up to the net problems, they will talk discreetly about the ramifications of their trials by fire.

Monday morning confusion

Early one Monday morning, for instance, pagers began to beep in a meeting of managers at a particular company. The organization's large router-based internet had been running smoothly for months until, suddenly, several hundred nodes started behaving strangely.

Distributed applications were unable to access their database servers, so the company's business ground to a standstill. As often happens, users blamed developers, developers blamed systems administrators, and administrators blamed the networking group. Through thorough detective work, network staffers traced the problem to the routers; apparently the configurations had been changed. Yet no one had been making changes to the routers' configuration tables.

Eventually, the truth unfolded. Apparently, the weekend before the failure, an office floor was powered down for electrical work. Systems were brought back up at the end of the weekend, and all units were operational. But the routers had lost their records of changes that had been made months ago while the net configuration was being debugged and modified. The router updates were never written to nonvolatile random-access memory, so they were lost in the powerdown.

The lesson learned was costly, yet simple: Write router changes back into nonvolatile memory immediately. This became part of a larger strategy to log and back up all changes to the production environment. From then on, after any large environmental event, such as a powerdown, the entire system environment was tested.

Propagating binaries

Another central issue confronting many companies today is how to distribute software binary files over a client/server-based network. Software binaries — the compiled versions of application programs — are often well over 1M byte, creating a number of size and bandwidth problems. Two companies took drastically different approaches to this issue.

The first firm concentrated on recoverability issues. Network managers and systems administrators were concerned that if only one copy of a binary existed and it was accessed via the Network File System (NFS), the load on the network would be unbearable. Every access to a part of the program not previously accessed would result in a request across the network.

Also, if all machines had to reconnect to an NFS server at once, which might occur due to a power outage or hardware malfunction, they would create a logjam of requests at the server. Therefore, this company decided to install application binaries on every client machine in the network.

The second company didn't consider the recoverability issue. It put the applications on a single NFS file server, accessible by well over 100 users.

The first company soon found that the number of applications grew faster than expected, so the disk space on the clients had to be increased considerably. Also, in this environment, some of the custom applications in the company were being released as often as once a week. When an application was released, the binary was propagated outward from a central point to several hundred workstations. Because each workstation often had a slightly different configuration, each had to be tested by hand to ensure that the installation was successful.

Deploying the software had to take place at night in order to avoid flooding the network during the regular workday. In some instances, the job sailed past midnight, with a crew of development, administration and network professionals on-site. This company eventually built tools to handle the distribution and became good at deploying software updates rapidly. But it took a year of late-night practice.

The second company was able to release a new application version to the same number of users in a matter of seconds by copying a new binary onto the server. The firm learned, however, that multiple servers are needed for redundancy. Both companies have modified their environments toward a middle position, where infrequently changed software can exist on the clients while frequently changed software exists on a set of servers. The more servers there are, the higher the overall system reliability.

Most often, the decision about how to deploy applications involves network managers, systems administrators and application developers. And when there is a deployment problem late at night, all of these people are called in. So companies learn to consider the long-term effects of architecture decisions on not only system recoverability, but also on human support efforts.

Falling off the net

At a different firm, concern mounted when a crucial database and communications server kept dropping off the net for no apparent reason. It was so sensitive that as soon as an administrator logged on to the machine remotely, the connection dropped. But the load on the machine was low. All the other machines on the net could see this machine using the Transmission Control Protocol/Internet Protocol PING command. The gurus were stumped.

Then they located the problem. Inside the root logon script, a vendor had inserted the command "Log out." It appeared as if the administrator was being thrown off by a network malfunction, but, actually, the machine was doing exactly what it was programmed to do — when users logged on, it logged them out. For a remote logon, this breaks the connection. The lesson: Sometimes the net is blamed for the strangest things.

Sudden storms

It starts with some users complaining about performance, then more complain. Then everyone complains. Network monitors reveal astounding amounts of network traffic. But there is no single source for all the traffic, and there is no discernible pattern.

This kind of scenario, referred to as a broadcast storm or a network meltdown, is most likely to occur on an internet running custom protocols. Broadcast storms also often crop up in

(continued on page 44)

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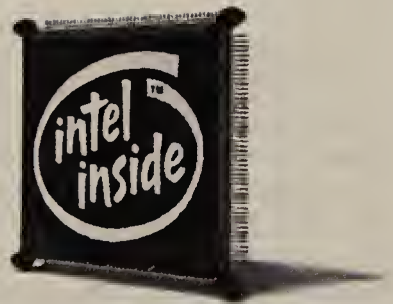

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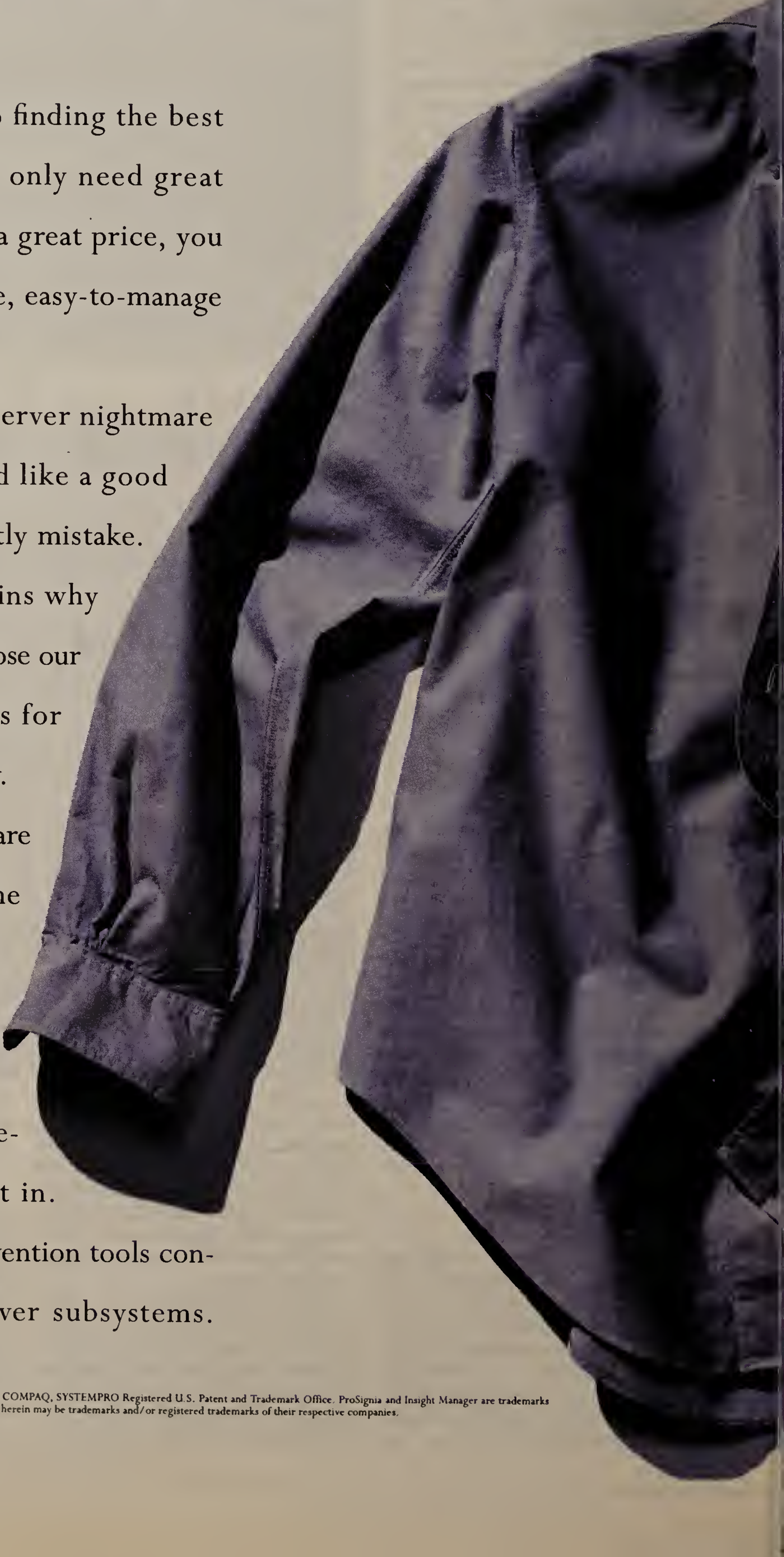

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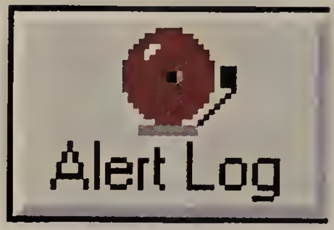

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Taking the first step

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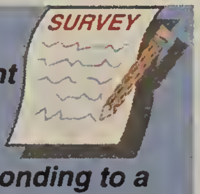
will be based probably aren't good candidates for an initial migration. There is too much risk in an initial client/server trial involving, for example, a trading system analytic program on which critical buy/sell decisions are made or a competitive marketing analysis program that supports product launch, marketing and pricing decisions.

As tempting as it may appear to move such tangentially mission-critical applications to a leading-edge architecture first, the potential for a slipup with significant ramifications is too great.

The same goes for truly mission-critical, core applications such as transaction-oriented corporate databases, reservation systems and material resource planning applications. They are best saved for more seasoned veterans of the client/server environment.



Fifty-six percent of Uniforum trade show attendees responding to a survey by Dun & Bradstreet Software indicated that they thought it would be "easy" or "not very difficult" to adopt client/server computing in the next 6 months and that they intend to do so.

It is instructive, however, to apply the lessons learned in migrating early test applications to these competitive-edge programs in order to smooth their ultimate migration. For example, these early applications should give net managers useful feedback concerning which aspects of the migration worked well or what rankled users.

The best choice for an organization beginning to deploy client/server applications are those that lend themselves to a front-end/back-end view, with easily isolated functions and separable tasks. Such "can't fail" applications as those for decision support often fall into this category because their user interface component can usually be readily separated from their underlying database.

This separation allows the network manager to off-load some of the processing of the back-end database server onto powerful client computers. Network application developers can extend the capabilities of existing applications, such as databases, by adding to or improving their "front ends."

For example, software developers can improve the efficiency of a database currently accessed via arcane and cumbersome SQL queries by allowing interaction from a graphical Windows-based front end on a personal computer with an improved and simplified query tool. And they can accomplish this without making substantial changes to the underlying data structure.

These types of applications are likely to have minimal disruptive impact on the current environment. Also, they provide some improvements in productivity and a glimpse of the benefits of broader client/server deployment.

Continuing the move

An enterprisewide plan and strategy is critical for organizations that want to continue to move toward increasingly open client/server computing. The nature of this architecture is to place more power and more productivity in the hands of end users. Net managers must decide at the outset the degree to which they want to empower the end user with data management and manipulation tools.

An enterprisewide plan and strategy is critical for organizations.

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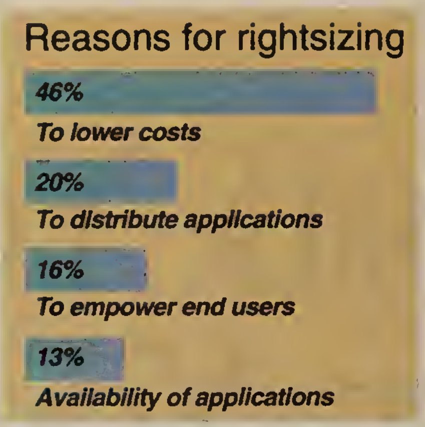
In addition, depending on which client end-user systems have been deployed, initial applications may dictate a particular client architecture. And network managers may uncover interdependencies in legacy applications that weren't apparent before the migration began. Dealing with these issues can streamline later client/server applications.

Without such a strategic charter, the positive impact of client/server migration is destined to remain insignificant. The sea change for traditional MIS organizations is the philosophical and tactical shift from the role of solution provider to solution enabler, as more power is delivered to the LAN and the desktop.



Therefore, network managers may find it beneficial to seek outside consultation on the best approach to a distributed corporate infrastructure. This would prevent conflicting agendas or the "not invented here" syndrome from standing in the way of an objective assessment.

Outside consulting — perhaps from a systems integrator or consulting firm that specializes in distributed client/server IS — can also be useful in navigating the maze of marketing hype and overstated availability of application development tools designed for this complex environment.

Client/server development tools are an emerging product area. As with any newly developed technology, some vendors emerge as leaders, while other firms are still struggling with the transition from a hierarchical computing approach to a distributed one. A way to mitigate the confusion concerning development tools is to use a third-party consultant with first-hand or installed-base experience and a variety of tools to make the migration to distributed applications simpler and more productive.

MIS managers or network managers might consider outsourcing for these specific needs, although not in the traditional sense of spinning off responsibility for the entire data center. Most organizations simply do not yet have staff with widespread distributed computing experience, regardless of the depth and breadth of the MIS staff supporting their legacy systems.

Faced with the decision to develop the expertise internally or look to outside resources, time to market would seem to dictate in favor of seeking outside support. Specific, task-focused outsourcing can speed client/server implementations and raise the level of internal staff expertise simultaneously.

MIS and network managers should not view outsourcing, in this case, as a threat to continued employment, but rather as a method for bringing client/server-specific expertise to bear in an MIS organization that continues to focus on its core competencies and for learning valuable new skills.

The big attraction

Client/server computing has attracted the attention of network managers and MIS managers worldwide who are drawn to its promise of increased flexibility, decreased time to market and dramatically improved multivendor interoperability. Clearly, network managers should not embrace this vision without carefully considering its long-term impact.

Seemingly minor changes in application access, however, can begin to have significant benefits, both in terms of efficiency and in changing the way an organization views information rather than data. Net managers should tread carefully because small changes in application deployment can have a broad impact on their organizations.

These moves can be giant steps — best taken in baby shoes — delivering measurable progress without stepping on toes.

Basile is an open systems zealot and manager of technology resources at Hauppauge, N.Y.-based ERI, a full-service commercial systems integrator. He can be contacted via the Internet at basile@bau.eri.com.

Chaos yields valuable lessons

continued from page 41

client/server networks and other distributed computing environments due to the large number of machines messaging each other.

One particular company had such a broadcast storm when it was using a protocol built on top of the User Datagram Protocol (UDP), which was designed to ensure that all broadcasts reached their intended destinations.

In the simplest scenario, a broadcast storm occurs when one slow machine requests packets to be rebroadcast. This will increase network traffic, thereby slowing down other machines. Some of these other machines slow down enough to miss packets and start rerequesting them, thus increasing network traffic. The situation amplifies until virtually all machines are missing packets and rerequesting them.

Protocol designers know that when a packet is not acknowledged or a packet is out of sequence, the rerequests must eventually time-out, otherwise, disconnecting a machine from the network for most of the day and then reconnecting it will release a blizzard of requests and responses, for instance.

Therefore, all introductions of new protocols should be handled with caution. This company learned the value of a strong test team: By constructing a series of rigorous tests, other meltdown scenarios were found and fixed before they occurred.

Preventing problems

When they work, client/server network environments empower users to work effectively and creatively. But this technology has a catch — when something goes wrong, the causes are often difficult to pinpoint.

Companies with large client/server environments are taking steps to increase reliability without sacrificing flexibility. First, net managers are asking for, and getting, more from outside vendors in the way of monitors and diagnostic tools.

Second, users are concentrating on putting effective change management processes into place. In distributed environments, simple events, such as a powerdown, a change in a logon script or a protocol update, can create chaos.

Protocol introductions should be handled with caution.

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And third, companies are taking testing more seriously, often putting into place automated regression tests that allow an entire environment to be tested whenever a component is changed.

All of these efforts are made so the technology created to empower its users does not end up enslaving the network support staff.

Nickerson is vice president of Applications Development at Network Management, Inc., a Fairfax, Va., consultancy that provides services for technology transformation and specializes in distributed systems design. He can be reached at (908) 302-0550 or via the Internet at jnickerson@nmi.com.

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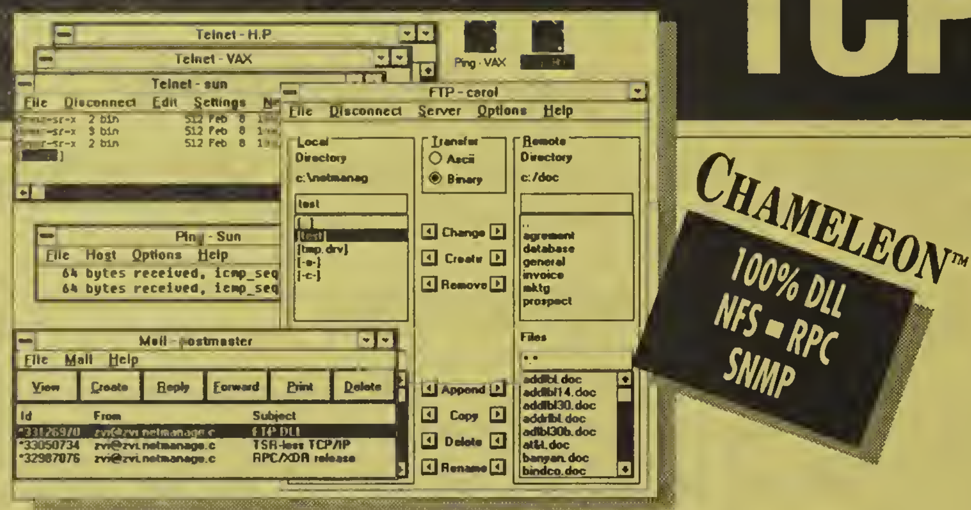

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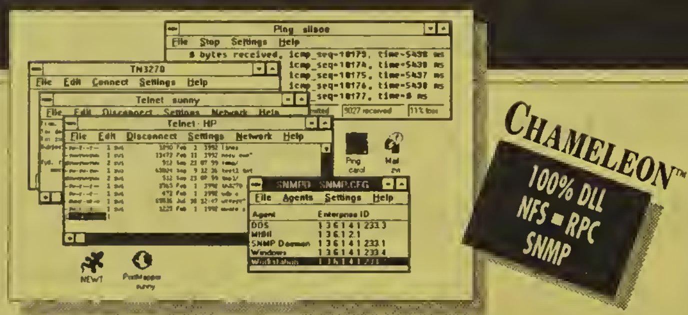

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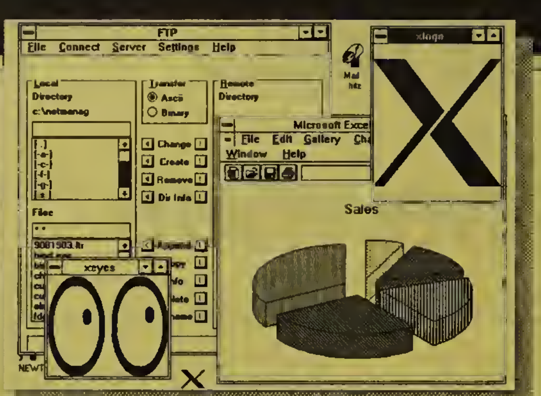

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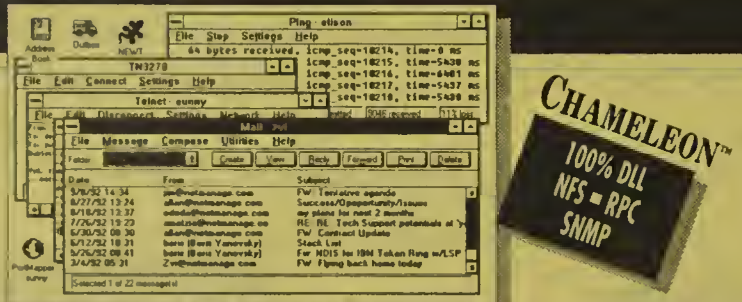

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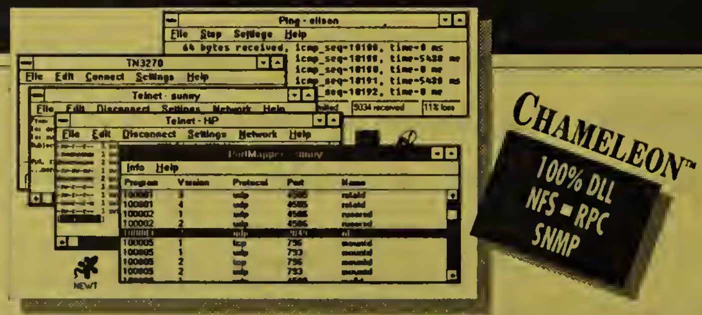

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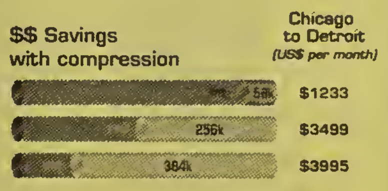

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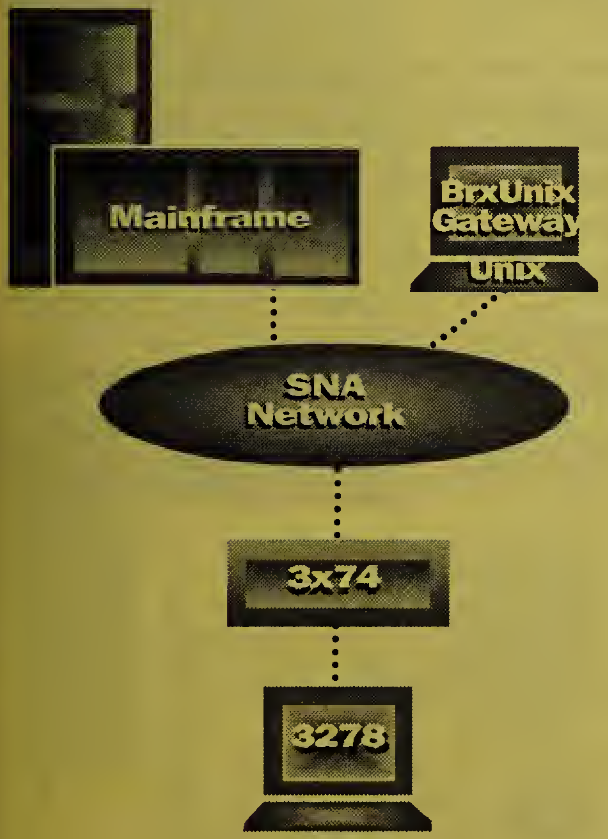

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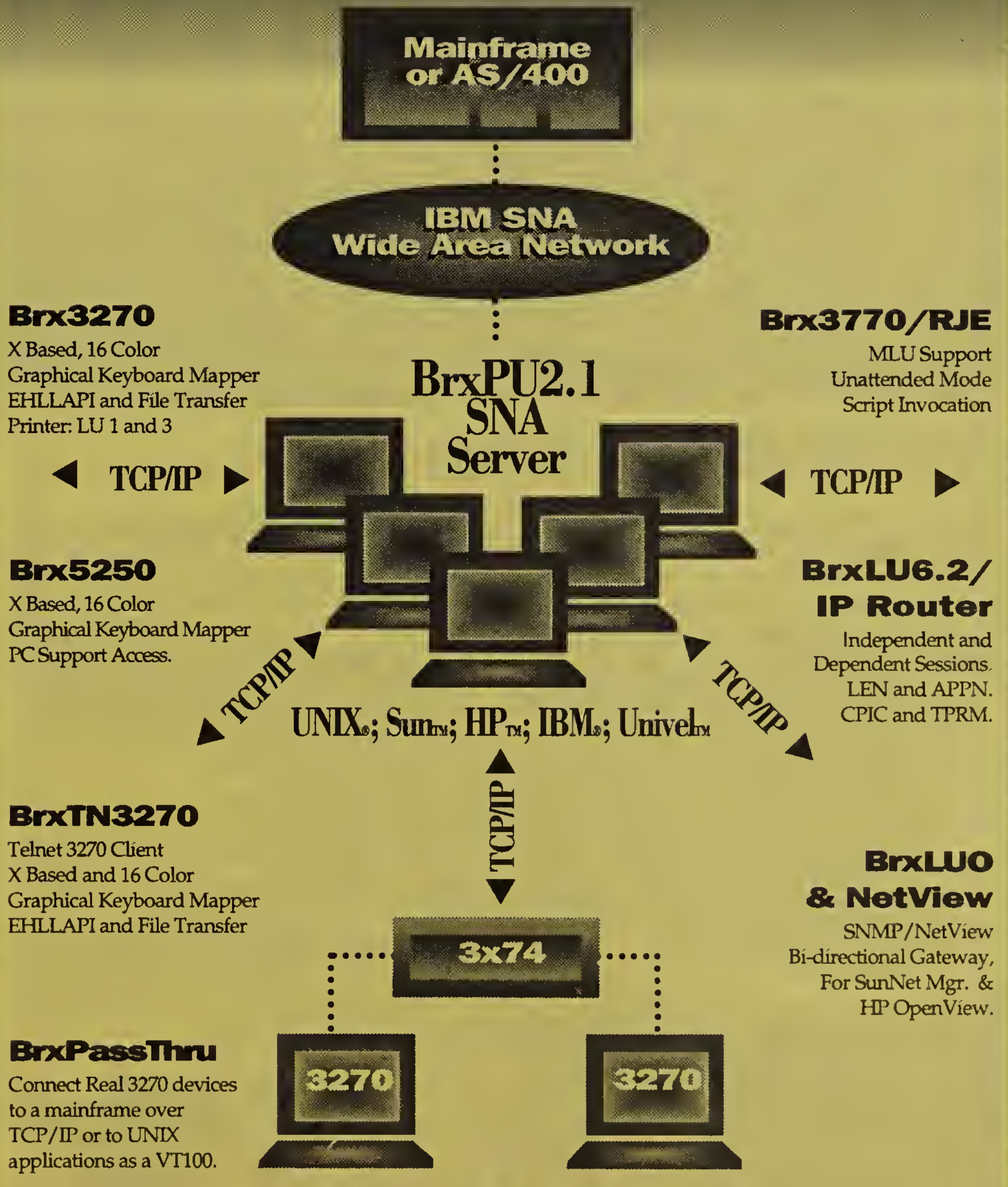

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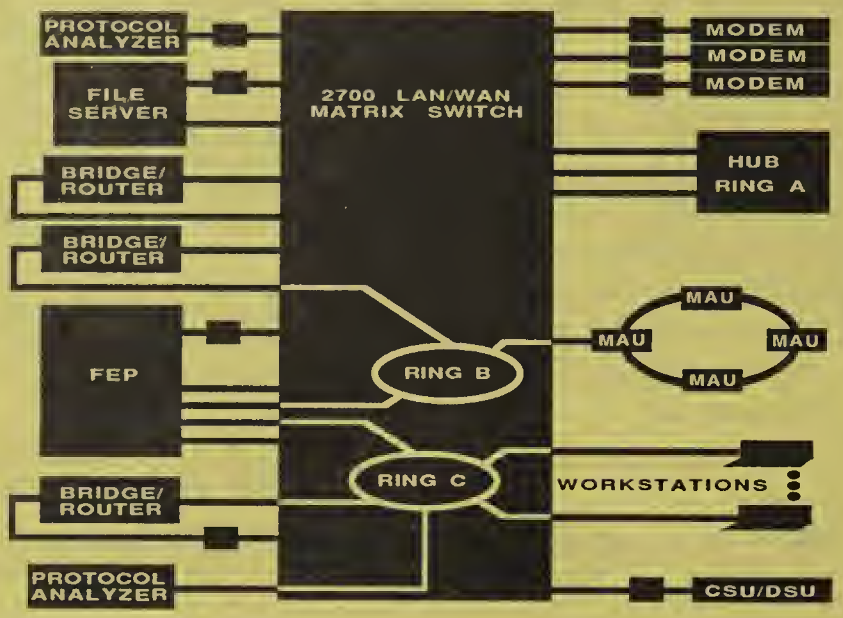

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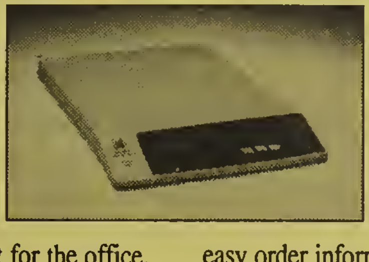

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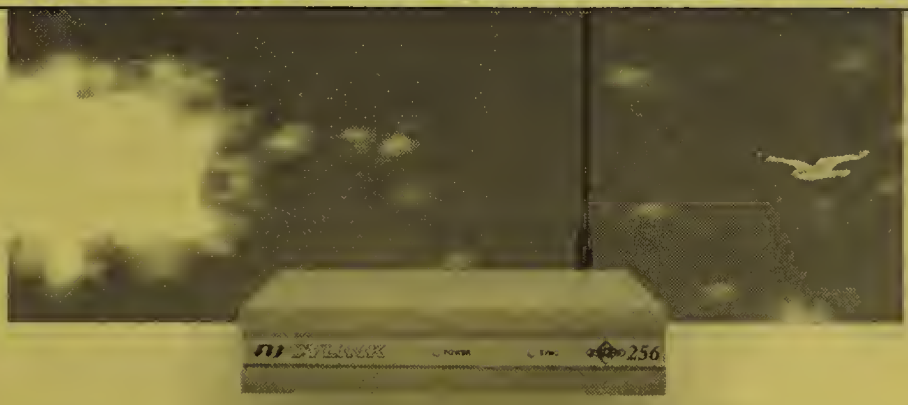

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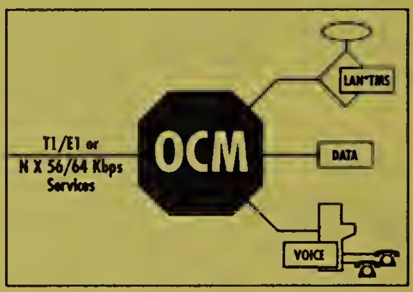

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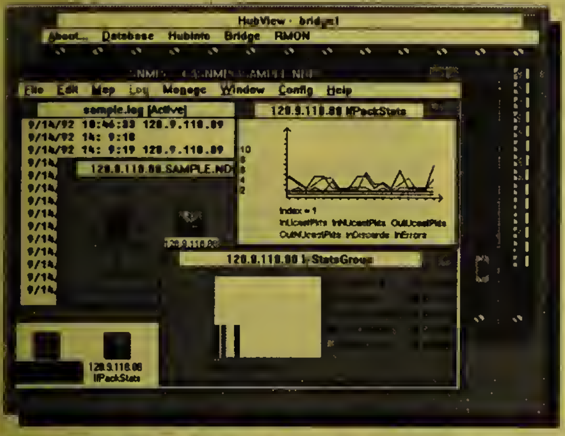
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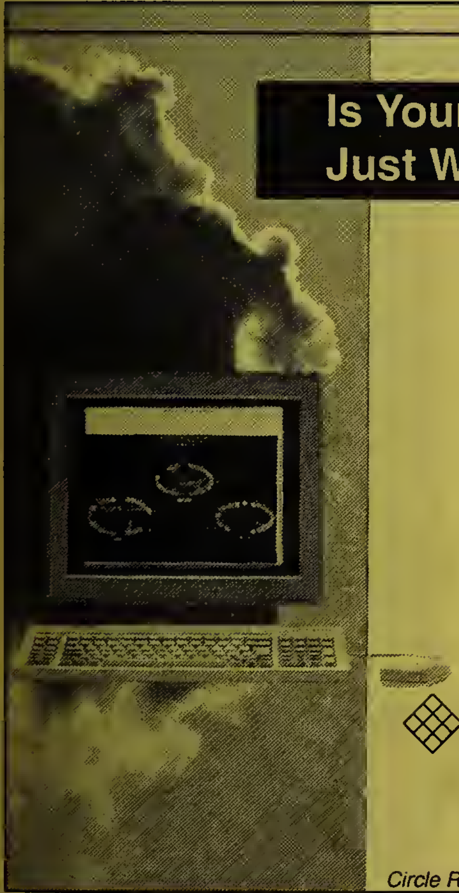

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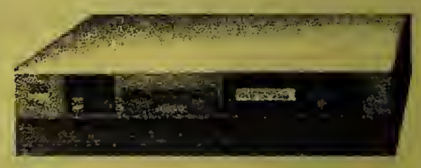

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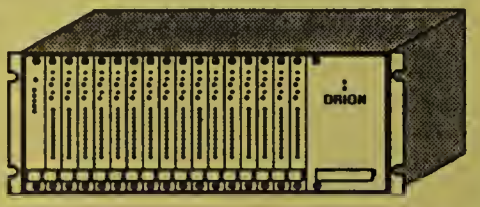

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2. Purchase timeframe
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3. Scope of purchase responsibility
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4. Purchase influence/number of sites
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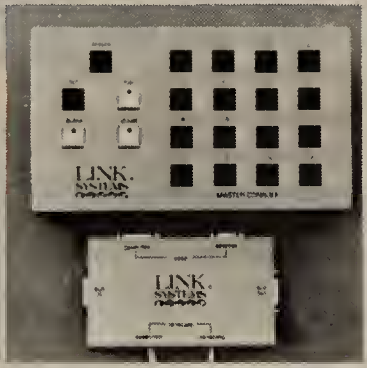

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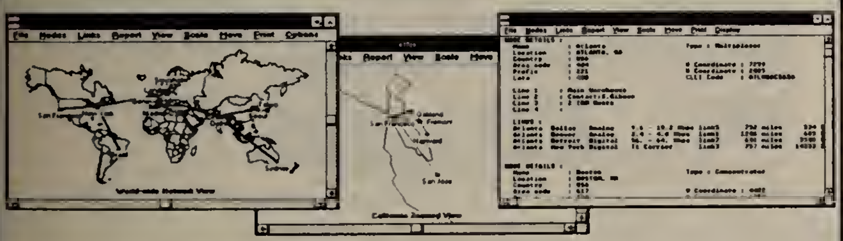

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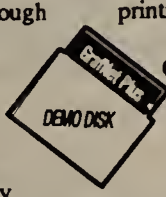

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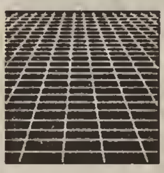

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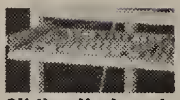

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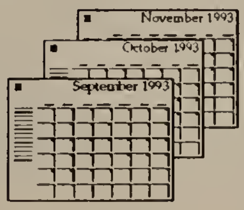

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☐ **Principal Engineer-ISO Protocols**

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☐ **Principal Engineer - Network Applications**

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—C and microprocessor Assembly Language programmer responsible for maintenance, debugging, performance enhancements and updates in Macintosh environment. Experience with UNIX device drivers a plus.

—Experienced applications programmer, familiar with all phases of project cycle from requirements to implementation. Experience with Lotus Notes helpful. Working knowledge of DOS, MS Windows and familiarity with 4GLs or products such as Dbase or Paradox required. "C" programming, and knowledge of UNIX and/or Macintosh beneficial. BSCS or equivalent required.

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☐ **Software Maintenance Engineers**

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MCI delays SMDS service

continued from page 1

fer a fully supported and featured service."

MCI detailed its plans for SMDS service at the INTEROP 92 Fall conference in San Francisco last October. The carrier said it would offer SMDS using a network of Siemens switches and Wellfleet routers *(NW,* Nov. 2, page 1).

Last week, Wellfleet claimed that it has done its part to keep the multivendor project moving forward. "We made our scheduled dates, but MCI changed theirs because of changing requirements," said a Wellfleet spokeswoman who would not elaborate further.

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Van Collens, senior vice president of marketing and business development for Siemens, admitted that delivery of necessary software went off-track. "It's true, we did have a software delay," he said. "We had a software load we weren't happy with, so we decided to hold back on it because we thought that would be the best course of action."

The delay deals the nascent SMDS market a tough blow because MCI is the only long-distance carrier to announce plans for interexchange SMDS, which would be used to link metropolitan-area SMDS nets.

Sprint Corp. has plans to carry SMDS traffic over frame relay — a nontraditional approach some current users of local carrier-provided SMDS have questioned. AT&T said its expanding Asynchronous Transfer Mode backbone network will enable it to support connectionless services, including SMDS, and is waiting to see whether market demand for SMDS materializes.

"This is a major setback for SMDS users like my organization," said Jim McCabe, long-haul communications/data networks subsystems manager for the Numerical Aeronautical Dynamic Simulation program with the National Aeronautics and Space Administration's Ames Research Center in Moffett Field, Calif. "We were counting on MCI to move the market forward."

McCabe's organization was the first in the nation to participate in an interexchange SMDS trial in which sites served by Pacific Bell and GTE Corp. were linked using AT&T long-haul service. He founded the SMDS Users Group, which pushes for widespread and affordable SMDS services.

Users are moving to SMDS because it can provide them with more bandwidth at a lower cost than private lines and the ability to cost-effectively support fully meshed networks for maximum reliability. But as long as SMDS is limited to metropolitan areas, its usefullness will be limited.

"We'd love nothing more than to build a nationwide SMDS network," said John Lee, a network administrator with Falcon Microsystems' networking and technical services division in Landover, Md. "But it's beginning to look like that won't happen any time soon." The firm uses Bell Atlantic Corp.'s SMDS service.

Frank Gratzer, executive director of broadband services at Bell Communications Research, Inc. in Red Bank, N.J., was cautiously optimistic about the future. "The MCI delay is a setback, but the SMDS movement will continue forward. It's not a question of how they will offer the service, it's a question of when."

MCI: (202) 872-1600.

Object vendors ally on apps

continued from page 4

alone program. XShell insulates programmers from underlying network protocols and communications issues, making remote objects and services appear to programmers as if they were available locally.

"We provide the glue that allows all the other object-oriented development tools to work together as a distributed system," said Mike Svendsen, director of Expersoft's strategic alliances here.

"We provide the glue that allows object-oriented development tools to work together."

▲▲▲

All alliance members have licensing agreements with Expersoft and have already begun efforts to make their products interoperate with XShell.

Persistence provides object-oriented access to relational databases; ADT makes a computer-aided software engineering tool that generates C++ code; Objectivity markets an object-oriented database; Lucid makes C++ compilers and debuggers; Logicon is a systems integrator that has developed class libraries for converting COBOL and FORTRAN code into C++; MRJ is a systems integrator that ported many of Expersoft's tools to a variety of platforms; and Angeli Systems provides a high-performance, distributed X.500 directory service (see story, page 1).

Keene said the alliance is more than just an Expersoft partners' program because it brings together a number of companies whose products are being used by a number of developers to build distributed systems.

"This alliance evolved naturally because many of us kept bumping into each other at joint customer sites and were asked by customers to integrate our products so they wouldn't have to," he said.

Expersoft's Svendsen said the alliance is open to any vendor or systems integrator that provides tools that can be used to build distributed object computing environments.

Svendsen: (708) 403-6718.

IBM braces LAN support

continued from page 4

drive, a Small Computer System Interface (SCSI) and an additional four ports for expansion.

The POWERserver 23S is a 45-MHz machine that features 16M bytes of memory, expandable to 64M bytes, a 1G-byte drive, SCSI, an integrated Ethernet adapter, plus an eight-port asynchronous device adapter.

According to IBM, the 23S is positioned as an entry-level server for small office environments. The 550L is for larger offices that need more room for expansion.

The POWERserver 23S will be available May 28 for $9,545, and the POWERserver 550L will be available June 4 for $27,450.

IBM also served up a Fiber Distributed Data Interface and Shielded Distributed Data Interface (SDDI) for improved high-speed LAN connectivity to its AS/400 mid-range system.

The FDDI adapter connects the AS/400 to 100M bit/sec fiber-optic LANs, and the SDDI adapter supports 100M bit/sec FDDI-over-copper cabling. The adapters will be available Dec. 17 for $5,500 and $5,200, respectively.

IBM: (800) 342-6672.

Novell prepares new router

continued from page 2

as does the current product. It will also be able to send this traffic over the Point-to-Point Protocol and X.25 links, a capability provided by the WAN Links product. Today, customers have to buy the products separately to get the full breadth of both local- and wide-area support.

Shipping with SRP

Completely new will be support for IBM's source routing protocol. Currently, the NetWare Multiprotocol Router can bridge token-ring nets only in an inefficient daisy-chain fashion.

For example, if a user has three rings, that person would have to be connected linearly — Ring A to Ring B to Ring C. With this setup, a user on Ring A has to go through Ring B to get to Ring C, explained Jamie Lewis, vice president at The Burton Group, a research and consulting house based in Salt Lake City.

Source route bridging also gives users alternate data paths, meaning a user on Ring A would still be able to talk to the user on Ring C, even if the server on Ring B was down.

The final product, therefore, gives users bridging, routing and wide-area connectivity in one software-based product. Analysts predicted this would be of particular interest to administrators hooking remote offices to the corporate net because it is a low-cost package that can run on virtually any standard hardware platform.

Looking to the future

Although further details of the June 7 announcement were not available, Novell is also expected to detail enhancements for its internetworking product line.

The final product gives users bridging, routing and wide-area connectivity.

▲▲▲

Among them is a plan to incorporate support for IBM's Synchronous Data Link Control protocol into the Multiprotocol Router Plus, although details of how that would be accomplished were unavailable.

There is also a rumor that Novell will announce plans to include better network management — including Simple Management Protocol support and a Windows-based management console — and traffic filtering of AppleTalk, IP and IPX protocols for better network segmentation.

AT&T offers new 800 features

continued from page 1

one database for number translation and another on a second processor for accessing advanced 800 features. Now, there will be only one lookup on a single fault-tolerant machine that is roughly 10 times faster.

"If we had attempted to support these new advanced routing features on our existing [processors], we would have sent call set-up times through the roof," Gilmore said. "Doing it this way enabled us to reduce call delivery from just under five seconds to about .7 seconds less."

Gilmore

One of the new features supported by the network changes is Next Available Agent Routing. With the new offering, users can specify where and under what conditions they want incoming 800 calls to be sent if the primary site is swamped. Firms can set thresholds as far as 13 months in advance and can override them within five minutes. Calls can be routed to as many as 99 locations.

If all locations are busy, AT&T can provide a busy signal, play a recorded message or forward the calls to a voice response system or service bureau.

The same capability is available today using Intelligent Call Processing, but that requires an on-site processor and a direct link into AT&T's Signaling System 7 network.

"The Next Available Agent feature enabled us to handle 15,000 more calls a month from our sales reps without adding any staff," said Robert Hughes, telecommunications manager for Avon Products, Inc., a Rye, N.Y.-based cosmetics sales firm.

With AT&T's new Multiple Number Database feature, users will be able to create call routing plans for multiple AT&T 800 numbers.

Today, firms can use the carrier's personal computer-based Routing Control Service offering to create a plan for each individual number.

Instead of using an on-site PC to build and upload routing plans, users simply call the plans into the carrier's Advanced Features Center in St. Louis.

"We have thousands of 800 numbers, and our staff used to spend hours planning and revising countless routing plans," said Pat Derr, telecommunications director for WATS Telemarketing Corp., a large 800 service bureau located in Omaha, Neb. "AT&T has made a quantum leap over its competitors with this feature."

AT&T's 800 Transfer Connect Service enables customers to use the carrier's network in order to redirect 800 calls free of charge to other AT&T toll-free numbers after the calls have been answered.

The feature has three options: Courtesy Transfer, in which the agent answers the call but does not say who is on the line; Consult & Transfer, where the call is forwarded after a dialogue with an agent; and Conference & Transfer, in which the agent stays on the line while a second agent is brought on-line.

"AT&T has a winner with this," said Cletus Jochec, an inside sales supervisor for Honeywell, Inc. "About 30% of Honeywell's 800 calls are the wrong number." Honeywell agents also use the feature to help callers reach its business partners.

With the carrier's Network Queuing, firms can have AT&T hold calls in its network until an agent is available. AT&T plays a recorded message every 30 seconds after the call is answered. This enables users to get by without adding staff or equipment.

Caller Recognition Routing enables firms to use automatic number identification to route calls to special agents or groups of agents. Working with a host database of customers in the AT&T network, this would enable a company to route big customers to more skilled agents.

The features will be generally available in September for varying costs. ☑

Startup sees big X.500 role

continued from page 1

Hughes Electronics in Long Beach, Calif., said, "Angeli has a much broader vision" than other vendors with which Hughes has met.

York said the company has found it frustrating looking for X.500 products to support a planned directory project.

Directories provide the essential service by which users and applications ascertain the location and attributes of resources on the network. By providing a single logical directory across servers, Traxis products will simplify administration and improve security, Chriss said.

Angeli Systems Corporation

Angeli, a privately held firm founded in July by former Retix employees, is scheduled to start delivering its software in the third quarter to OEMs and later to users. OEMs will include Isocor, which plans to integrate the technology in its message server line. Angeli plans to ship to beta users in the fourth quarter, with general availability set for early 1994.

The heart of Angeli's product line is the Traxis Directory Engine (TDE), server software that stores and manages directory information. The directory information base can be distributed across servers, in part or in full, for efficiency and redundancy purposes. TDE will initially run on systems running Unix from Hewlett-Packard Co., IBM, The Santa Cruz Operation, Inc. and Sun Microsystems, Inc. and will be ported to OS/2 and Microsoft Corp.'s Windows NT.

Traxis Directory Agent (TDA) software will tie applications to the TDE. TDA, which runs at the server and on the client, will support messaging interfaces, such as the Vendor Independent Messaging specification or Microsoft's Messaging API, to enable any application written to those application program interfaces (API) to access directory services.

The TDA will also support a customizable API, dubbed XDS++, that will let users tie any application into the directory. The agent software supports the same server platforms as TDA, as well as popular clients such as Apple Computer, Inc.'s Macintosh and personal computers running Windows.

To help users create a logical enterprise directory, Angeli will provide gateways between its directory engine and proprietary E-mail directories, relational database management systems from vendors such as Oracle Corp. and Sybase, Inc., and naming services from leading network operating system vendors, such as Banyan Systems, Inc. and Novell, Inc.

Angeli will provide the Traxis Global Browser to provide desktop access to part or all of a corporate directory for general and administrative purposes.

The directory system will be manageable via the Traxis Administrative Console, which will provide a graphical view of the logical and physical directory. It will be available initially on Windows PCs. Angeli will also provide a Simple Network Management Protocol agent to enable its products to be managed by SNMP management systems.

Angeli: (310) 392-3000. ☑

Fore rolls out ATM blueprint

continued from page 2

prices, the company is exploring methods to provide ATM over copper wiring. The ATM Forum is currently considering four main proposals for doing just that at various speeds, including 25M, 50M, 100M and 155M bit/sec. Fore Systems next month will announce support for the 100M bit/sec proposal.

"We're initially going with 100M bit/sec copper because the chips are here, and it won't require a lot to fine-tune the FDDI-over-copper standard for use with ATM," Juliano said.

While pricing is a top concern in terms of ATM acceptance, a number of other factors, including industry standards and multivendor interoperability, still need to be addressed, said Tom Nolle, president of CIMI Corp., a consultancy in Voorhees, N.J.

"Only one user out of every 10 is a credible prospect for ATM, even under the reduced prices," he said. "But that one out of 10 may generate enough market sanity to force the vendors to start focusing on those other issues that require attention."

The firm is also looking to up the performance of its ATM workstation interfaces and offer ATM adapters for more platforms.

Also, Fore Systems will introduce next month the SBA-200 SBus ATM Computer Interface, which offers three times the throughput of its current card.

The SBA-200, for Sun Microsystems, Inc. SPARCstations, will feature a new design that offloads processing chores from the workstation CPU to a board-based Intel Corp. i960 processor that can handle the ATM Adaptation Layer calculations and direct memory access functions.

The SBA-200 will provide 70M bit/sec of throughput over Transmission Control Protocol/Internet Protocol nets — vastly improving on the SBA-100's 25M bit/sec rate — and throughput highs of more than 85M bit/sec when used in pure ATM nets.

The card is expected to be available in July for $2,495.

The company plans to be one of the first vendors to unveil ATM adapters for personal computers. The first product will be an adapter for Extended Industry Standard Architecture-based machines, such as Hewlett-Packard Co.'s 700 Series. The adapter is based on the design of the SBA-200 and will be ready by July.

According to Juliano, development of an IBM Micro Channel Architecture ATM adapter is under way, and work will begin soon on an adapter for Apple Computer, Inc. Macintoshes.

"If ATM is going to start to appeal to the masses, it must move down to the PC level," Nolle said.

Plans are also in the works to extend Fore Systems' support for additional technical workstations. In August, the company will roll out an adapter for VME buses, and the company has started to explore the idea of offering an adapter for Digital Equipment Corp.'s Alpha workstations.

To help customers grow into ATM environments, Fore Systems this fall plans to roll out ForeView, a Simple Network Management Protocol-based net management application that will run atop HP's OpenView and allow users to control and monitor Fore Systems gear.

Juliano

The application will feature a graphical user interface that will enable net managers to graphically portray a variety of information, including bandwidth utilization, as well as create topology maps and pull-down menus.

Fore Systems: (412) 967-4040. ☑

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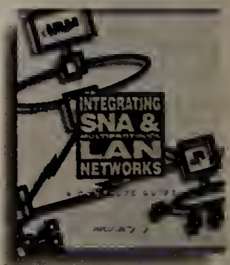

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